VOGTLE ELECTRIC GENERATING PLANT
MACROINVERTEBRATE SURVEY OF THE SAVANNAH RIVER
BURKE COUNTY, GEORGIA, JANUARY TO NOVEMBER, 1981
OPERATING LICENSE STAGE ENVIRONMENTAL REPORT
TECHNICAL DOCUMENT

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VEGP - OLSER

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INTRODUCTION

Construction of the Vogtle Electric Generating Plant (VEGP) began in June, 1974, and was discontinued in September, 1974, as a result of unfavorable economic conditions. Construction resumed in January, 1977, with excavation activities beginning in February. The plant site is approximately 3169 acres and located in Burke County on the southwest side of the Savannah River, the natural boundary between Georgia and South Carolina. The site is at river mile 150.9, across from the Savannah River Plant (SRP) operated by E. I. DuPont DeNemours and Company for the U.S. Department of Energy. The plant site is approximately 26 miles south-southeast of Augusta, Georgia. The site is located in the coastal plain, which is characterized by sandy or sandy loam soil with rolling hills and mixed pine-hardwood association. Since the onset of construction, approximately 1391 acres of the site have been cleared for plant construction.

The original plans proposed a generating plant consisting of four units, but construction of two units has been cancelled. The plant will employ two pressurized water reactors producing 1160 MW each. Unit 1 is scheduled to go into service in March, 1987, and Unit 2 in September, 1988. The exhaust steam will be cooled by a closed-cycle cooling system employing natural draft cooling towers using make-up water from the Savannah River. Low volume waste and blowdown from both cooling towers will ultimately be discharged back into the river.

The Savannah River below Augusta, Georgia, and above the VEGP site receives wastewater discharges from municipalities and industries that add organic wastes, nutrients, metals, and other trace contaminants. Stream classification near the VEGP is listed as "Fishing."[1] The river near the plant site is typical of large southeastern coastal plain rivers except that a dredged channel is maintained by the Corps of Engineers for barge traffic. The biological community of the river is similar to that of other large southeastern rivers but has been affected by man's influence on the river. The impoundment of the river above Augusta, Georgia, has reduced the transport of sediments and allochthonous particulate organic material, and the dredging of the channel has reduced the natural shallow areas and backwaters that would normally support a diverse benthic fauna. The open portion of the river is generally unsuitable for many bottom-dwelling invertebrates due to the shifting sand substrate which does not provide an optimum habitat for colonization.[2] Studies on the Savannah River flora and fauna have been conducted periodically since 1951 and were detailed in Patrick, et al.,[3] Academy of Natural Sciences of Philadelphia,[4][5] and Matthews.[6]

Georgia Power Company was required by Chapter 2.2 of U.S. Nuclear Regulatory Commission Regulatory Guide 4.2, Revision 2, 1976, to conduct a biological study to describe the flora and fauna in the vicinity of the site, their habits, and distribution. The study should identify organisms

defined to be "important" because of commercial or recreational value, threatened or endangered status, effects on other "important" species, or being a biological indicator of radionuclides in the environment. In addition, food chains and other interspecies relationships are to be identified. To this end, a study of the macroinvertebrates in the Savannah River between river 150.6 and 151.2 was conducted between January and November, 1981.

METHODS

Six sampling stations were located on the Savannah River near the VEGP at approximate river miles 150.6, 150.9, and 151.2, approximately 35 feet from the east and west banks (figure 1). A typical benthic station was composed of an anchor, two floats, three multiplate samplers, and one basket sampler (figure 2). Each multiplate sampler was composed of ten unglazed porcelain discs 3.1 inches in diameter and 0.3 inches thick held together by a 5.9-inch stainless steel eyebolt. Each plate was separated from the other by a 0.1-inch thick neoprene washer. Each sampler had a surface area of approximately 1.3 feet^2. The basket sampler was a wire mesh barbeque basket containing fourteen 2.0-inch diameter unlapped porcelain spheres with a total surface area of approximately 1.2 feet^2.

The multiplate and basket samplers were exposed for approximately six weeks before they were collected.[7] Two of the three multiplate samplers were collected for insect identification for each sampling period. The third sampler was a spare used if one of the other samplers was lost. Prior to removal from the water, each multiplate sampler was enclosed in a 9.8 inch by 9.8 inch nylon recovery bag with a drawstring top. A field label was placed into the bag, and the bag was secured by tying. The bag was then placed in a solution of ten percent formalin. The basket samplers were recovered by carefully maneuvering them into a five-gallon plastic container prior to their removal from the water. The container with the basket sampler inside was removed from the river. The door on the basket was opened and the spheres were emptied into a fine mesh collecting bag with a drawstring top. A field label was placed inside the bag which was tied shut and placed into a solution of approximately ten percent formalin.

Five petite-ponar dredge samples were also collected at each station; two on the bank side of each station float and one at mid-channel. Dredge samples were washed in the field using a U.S. #30 sieve and placed into labeled one-liter wide-mouth jars with enough 40 percent formalin to make an approximate ten percent solution. The combined area sampled for the five grabs was 1.4 feet^2.

Air temperature, water temperature, dissolved oxygen, and pH measurements were recorded at each station for each collection period. In addition to the above measurements, two 250 ml water samples and a one liter sample were collected for chemical analysis. One 250 ml sample was preserved in the field with 1.0 ml concentrated sulfuric acid, and the other

was preserved with 1.0 ml concentrated nitric acid. Chemical analyses were performed according to Standard Methods for the Examination of Water and Waste Water, APHA, 14 Edition, or Chemical Analysis of Water and Waste, EPA, March, 1979.

Current velocity was measured at each station using a Pigmy Pattern flowmeter placed at the depth of the multiplate samplers. Three separate measurements of three-minute duration were made at each station and averaged to obtain the ambient stream velocity for each station.

In the laboratory, each multiplate sampler was disassembled over a plastic dishpan, and the plates lightly washed with a soft bristle brush and rinsed with a light stream of water. The spheres from the basket samplers were washed in the same manner. The material from these washings was concentrated in a U.S. #30 sieve and preserved in jars of 70 percent ethyl alcohol. Ponar dredge samples were stained with Eosin-B-Biebrich Scarlet[8] in order to facilitate sorting of organisms from detritus.

For all samples, organisms were sorted from detritus in a white enamel pan under an illuminated three-diopter magnifier. The sorted organisms were stored in vials and preserved with 70 percent ethanol.

Organisms were identified to the lowest practical taxon and enumerated using dissecting microscopes with a maximum magnification of 70 power. A taxon is considered to be the lowest level to which an organism is identified. Macroinvertebrates were identified using the following keys: Merritt and Cummins;[9] Edmunds, et al.;[10] Hilsenhoff;[11] Needham and Westfall;[12] Parrish;[13] Ross;[14] Sinclair;[15] Edmondson;[16] and Wiggins.[17] Consistent identification was maintained through the use of a reference collection of voucher specimens whose identification had been verified by an independent source.

An analysis of variance (ANOVA) was performed on the multiplate, basket, and ponar data for number of taxa, number of individuals, and number of individuals transformed as Log_{10} (number of individuals + 1). Factors analyzed were station, month, and station-month interactions. When significant differences were detected at the 0.05 level, Duncan's Multiple Range Test of Means was also performed. ANOVA was also performed for east vs. west bank for number of taxa and transformed number of individuals for multiplate samples.

RESULTS AND DISCUSSION

Artificial substrates were chosen as the principal means of collection because of the numerous advantages they afford including convenience of use, standardization of sampling, and comparability of data over long periods of time.[18][7][19] Comparability was an important consideration due to the probability of long-range future monitoring studies connected with plant operation.

Ponar samples were used to document those organisms occurring in the natural river substrates that might otherwise be overlooked due to the selectivity of artificial substrates for some groups of organisms. Due to the predominantly loose sand substrate present in the river at all the stations, four of the five grabs made at each station were made in shallower water near or into the river banks where more suitable substrate for macroinvertebrates was likely to be found. The fifth grab was made at mid-channel to collect those organisms that did, in fact, occur in the sandy substrate.

This study revealed a varied macroinvertebrate fauna in the Savannah River in the vicinity of the VEGP. The major invertebrate taxa that would be expected in a large southeastern coastal plain river, such as, Ephemeroptera, Trichoptera, Coleoptera, Diptera, etc., were collected and were generally similar to collections made in previous studies[3][4][5] even though collection methods differed.

Multiplate and ponar samples were collected at each station in January, February, March, May, June, August, September, and November, 1981. Table 1 presents the numbers of individuals collected by multiplate samplers. Basket samplers were only collected in January, February, March, and June, 1981; and these data are presented in table 2. Table 3 presents the numbers of individuals collected in the Ponar samples for all months.

A total of 70 taxa of macroinvertebrates were collected on multiplate samplers, 54 taxa on basket samplers, and 61 taxa in Ponar samplers in 1981.

Data for total numbers of organisms and percent composition of organisms by numbers collected on multiplate samplers at individual stations during 1981 are presented in tables 4 through 9. Similar data for basket samplers and Ponar samples are presented in tables 10 through 15 and tables 16 through 18, respectively.

Ephemeroptera

Ephemeroptera (mayflies) were represented in all collections by 11 taxa. The greatest numbers consisted of Stenonema spp. More Stenonema spp. were recovered from the multiplate samplers which apparently provided a more suitable substrate than did the baskets. They were present throughout the year at most stations with the greatest numbers occurring in the summer and fall. Stenonema spp. have been reported as spending most of their life cycle in the nymphal stage and being present in streams at various stages of development throughout the year.[20] Baetis spp. and Heptagenia spp. were present at most stations throughout the year. Tricorythodes spp., occurred mostly on the multiplate samplers but did not appear in the collections until June, and their numbers declined by the November sampling period. Various life cycles have been reported for Tricorythodes with the greatest abundance of nymphs generally occurring from late spring to early fall.[10]

Stenonema spp., Baetis spp., Heptagenia spp., and Tricorythodes spp. are all similar in habitat and trophic relationships. All are considered to be sprawlers or clingers feeding on decomposing fine particulate organic matter and/or periphyton.[9] The sediment and algae which collected on the multiplate and basket samplers probably provided an adequate food source for these organisms. In some cases, however, the sediment load on the baskets seemed quite heavy. Lemly[21] noted the accumulation of inorganic sediment on the body surfaces and respiratory structures of stream insects in a North Carolina stream and determined this silt accumulation to be directly associated with a reduction in the stream insect population. Hynes[22] reported that the majority of invertebrates living in silty environments have specialized body structures, such as, coverings of fine hair and/or operculate gills to help prevent the silt from interferring with respiration or movement. Stenonema spp. lack such structures, and the increased sediment may have accounted for the low number of Stenonema spp. that were collected on the baskets.

Although the Ephemeoptera were reasonably well represented with regard to number of taxa present, the total numbers of individuals in relation to the overall aquatic community were low. The greatest contribution by a single taxon at one station was made by Tricorythodes spp. in the June multiplate sample at Station 150.9W when it comprised 8.0 percent of the total population. Generally, each taxon contributed less than one percent of the total individuals collected at any given station.

Studies on the macroinvertebrate fauna of the Altamaha River near Baxley, Georgia, by the Georgia Power Company,[23][24] revealed greater percent compositions of mayflies than those determined in the current study. The Altamaha River at Baxley has also been classified as "Fishing."[1] The Altamaha River, like the Savannah River, is broad and bordered by extensive alluvial plains and expanses of bald cypress. The substrate is predominantly loose sand, and the primary habitats for aquatic macroinvertebrates are the submerged limbs and trees. The channel has not been dredged, however, and is not maintained as is the Savannah's. The sampling locations in the Altamaha also do not receive commercial and industrial wastes as does the Savannah.

Odonata

Eight taxa of Odonates were collected during the course of the study, but the numbers of individuals collected were extremely low (only four on artificial substrates). When the habits of the group as a whole were considered, this low representation was expected due to the unsuitability of the artificial substrates. Similar results were observed by Mason, et al.,[25] who found relatively low numbers of Odonates in basket samplers in a study of the Ohio River. Argia spp. and Neurocordulia spp., collected on the multiplates and baskets, have been classified by Merritt and Cummins[9] as climbers and clingers and would normally be found on vegetation. Dromogomphus spp., which was only collected in Ponar samples, has been classified as a burrower.

Coleoptera

Coleoptera collected were mostly members of the family Elmidae (riffle beetles) and accounted for few of the total numbers of organisms collected during the survey. They appeared to be rather evenly distributed among the stations and sampling methods with no specific identifiable trends. The elmids, both larvae and adults, were listed by Merritt and Cummins[9] as clingers and collector-gatherers, or scrapers. Their habitat and feeding mode is similar to many of the mayflies collected.

Oligochaeta

Greater total numbers of Oligochaetes were collected on basket samplers than on multiplate samplers. This was due to the basket samplers acquiring a heavier silt load than the multiplate samplers and forming a more suitable habitat. In terms of percent composition, this group did not contribute heavily to the overall population on either the baskets or the multiplates. The Oligochaetes did comprise a large proportion of the organisms collected in the Ponar samples. They accounted for a maximum of 91.8 percent of the total organisms collected in the March samples at Station 151.2 and 57.1 percent of the total organisms collected during the year. They were present in the Ponar samples at all stations in all sample periods. Maximum abundance was reached in March at all stations. The population density based on the total sampling area and total numbers collected ranged between 5746 and 13,285 Oligochaetes per square meter. This is a conservative estimate due to the fact that few worms were found in the samples taken at mid-channel while the actual densities nearer the banks could have been much greater.

Studies conducted on the Altamaha River near Baxley, Georgia, where a predominantly sand substrate was sampled, revealed densities of Oligochaetes from $670/m^2$ to $940/m^2$.[23][24] Similar studies on the Chattahoochee River near Newnan, Georgia, found mean densities of Oligochaetes ranging from $10/m^2$ to $100,000/m^2$.[26] The high densities of Oligochaetes present in the Chattahoochee study were attributed to organic pollution of the river. Mason, et al.,[27] also associated the large Oligochaete populations with organic enrichment. Generally, many Oligochaetes feed by ingesting substrate particles from which nutrients are absorbed by the gut with undigested matter being eliminated from the body. Increased nutrients in the substrate could be responsible for the greater numbers of Oligochaetes in the Savannah River.

Pelecypoda

Another taxon which occurred principally in the Ponar samples was Corbicula sp. Corbicula sp. are filter feeders consuming organic material suspended in the water column. The artificial substrates provided unsuitable habitats for colonization by this organism. Corbicula sp. were more abundant at Station 150.6C. Maximum numbers of individuals were collected in June

and August at Station 150.6C with densities of 892/m^2 and 1177/m^2. Maximum density at Station 150.9C occurred in August with 223/m^2 and at Station 151.2C in November with 277/m^2. The most probable explanation for this variation in numbers among stations was natural aggregated dispersion. Of the 153 individuals collected at Station 150.6C in August, 143 were collected in the first two grabs near the west bank of the river. Gardner, et al.,[28] found irregular population densities of Corbicula sp. and population fluctuations through time in a study on the Altamaha River. It is unlikely that substrate differences between stations would have any influence on the population as it has been demonstrated that Corbicula sp. show little or no substrate preferences.[28]

Platyhelminthes

The Trematoda, found only in the Ponar samples, were represented by cercaria, a freeliving stage in the life cycle of a parasitic fluke. In a typical fluke life cycle, cercaria will encyst in a second host, such as a small fish, which may then be eaten by a larger fish where the fluke will develop into an adult to complete its life cycle. These cercaria have also been found in Petersen dredge samplers taken in a coastal plain reach of the Ocmulgee River near Macon, Georgia.[29] Dispersion and abundance of these organisms in the current study and the Ocmulgee study was quite variable. Their occurrence and distribution did not seem to be associated with any environmental conditions.

Plecoptera

The Plecoptera, or stoneflies, were represented by 12 taxa. Perlesta placida made the greatest contribution to the total numbers collected and were present primarily in the samples taken in February, March, and May. Low numbers of Plecoptera were also reported from artificial substrate sampling on the Altamaha River, Georgia, with maximum numbers of Perlesta placida occurring in April samples.[23][24] Stark and Gaufin[30] reported Perlesta placida as emerging in Florida from April to August. The stonefly larvae collected, with the exception of three genera, were all predators which feed primarily on Diptera, Ephemeoptera, and Trichoptera.[9] All of these prey organisms were abundant on the substrates.

Trichoptera

The 18 taxa of Trichoptera, or caddisflies, collected made the second greatest contribution to the total numbers of individuals collected on the multiplate and basket samplers. They comprised 35.5 percent of the total individuals on the multiplates and 30.4 percent of the total individuals on the baskets during the year. Trichoptera were also collected in the Ponar dredge samples but only comprised 1.8 percent of the total individuals collected during the year.

Most of the caddisflies were represented by two families, the Philopotamidae and the Hydropsychidae. Chimarra spp. was the only philopotamid collected

and contributed only 2.7 percent and 3.5 percent of the total Trichoptera collected on the multiplates and baskets, respectively. The Hydropsychidae comprised 89.4 percent of the total Trichoptera collected on the multiplates and 84.7 percent of the total of those on the baskets. Within the hydropsychids, Cheumatopsyche spp. alone made up 69.3 percent and 75.2 percent of the total number of individual caddisflies collected on the multiplate and basket samplers, respectively. This large percentage of hydropsychids was in agreement with figures cited by Wallace and Merritt.[31] Cudney and Wallace[32] reported Cheumatopsyche pasella to be the most abundant filter-feeding caddisfly in the Savannah River. They suggested that its success and the success of Hydropsyche incommoda was due to the size of the capture net mesh openings of the highly productive fifth instar larvae. These larvae are able to filter particle sizes in the water column that are high in the proportion of organic to inorganic matter.

Maximum abundances of Hydropsyche incommoda and H. rossi occurred in the May and June multiplate and basket samples. Maximum abundances of Cheumatopsyche spp. occurred in November in the multiplate and January in the basket samples. A population peak for Cheumatopsyche spp. was also noted in August. The data did not indicate definite population dynamics, but Cudney and Wallace[32] reported bivoltine life cycles for H. incommoda, H. rossi, and C. pasella in their study area on the Savannah River with pupation of the overwintering generation occurring in April and the summer generation in September. Maximum numbers of Chimarra spp. were collected in the August and September multiplate samples and the June basket samples. Cudney and Wallace[32] also reported a bivoltine life cycle for Chimmara mosleyi on the Savannah River.

The Philopotamidae and the Hydropsychidae are all filter-feeding caddisflies utilizing capture nets of various sizes and configurations to passively gather their food. The philopotamids (i.e. Chimmara spp.) construct elongate, sac-like nets with very small net mesh openings that retain very fine food particles.[33] The hydropsychids (i.e. Hydropsyche and Cheumatopsyche) construct nets perpendicular to the current flow.[31] The net mesh openings vary with instar and species.[31][33][34] This variation in capture net mesh openings is a method of partitioning available food resources among coexisting species.[35][36]

Diptera

Six taxa of Diptera (true flies) were collected. The Chironomidae, or midges, comprised the largest number of individuals of the Diptera or of any other taxa collected.

The Chironomidae are a very diverse family in terms of biology and ecological/environmental requirements. The group contains both predatory and non-predatory species as well as those that are freeliving and retreat builders. Many of the non-predatory tube-dwelling species are filter feeders utilizing silken nets similar to Trichoptera. A large proportion

of the midges collected were taken from cases, and many empty cases were present in the sample, suggesting that many filter-feeding species were present.

The Chironomidae were the predominant organisms present on the multiplate and basket samplers throughout the study period. They were collected on all samplers on all dates and accounted for over 65 percent of all of the individuals collected during the study. Chironomids were also present in large numbers in the Ponar samples. Population peaks on the multiplate samples occurred in August, September, and November and on the baskets in January. Maximum numbers were collected in the Ponar samples in September. Chironomids were present in smaller numbers and generally comprised less than 20 percent of the total population on modified Hester-Dendy multiplate samples in studies on the Altamaha River. In addition, seasonal peaks approached 45 percent of the total individuals in some instances[23][24] and generally, higher numbers of individuals occurred at high water temperatures. In warm habitats, emergence has been noted to occur throughout the year.[37]

Community Structure

When the data for the multiplate and basket samplers were examined with respect to overall community diversity, it became apparent that two taxa were dominant: the Chironomidae and the Hydropsychidae of which Cheumatopsyche spp. were most prevalent. Total numbers of chironomids and Cheumatopsyche spp. comprised a minimum of 57 percent and a maximum of 96 percent of the organisms collected on the artificial substrates during this study. There were only three collections where these two taxa comprised less than 70 percent of the total organisms collected on multiplates. Total numbers of Chironomidae and Cheumatopsyche spp. comprised a low of 75.2 percent of the total organisms collected on the basket samplers at Station 150.9E in June to a high of 95.2 percent at Station 150.6W in January. These two taxa comprised over 80 percent of the total organisms collected on baskets at all stations on all dates except in three instances.

Even though many other taxa were represented, their total contributions to the overall community structure was low. Taxa, such as the Ephemeoptera and Plecoptera, seemed to be underrepresented when the current study was compared to similar past studies.[23][24][29]

The Oligochaeta were dominant in the Ponar samples accounting for 57.1 percent of the total organisms collected. The next most abundant taxa were the Chironomidae with 19.2 percent of the total numbers and Corbicula sp. with 6.0 percent. Collectively, these three taxa composed from 41.8 percent of the total collection at Station 151.2C in August to 91.4 percent at Station 150.6C in September. In only three Ponar collections were their collective totals below 50 percent of the organisms collected at any given station on any given date.

Generally, a healthy aquatic community should have large numbers of species with no individual species (taxon) present in overwhelming abundance. Ranking of the species by their numerical abundance would reveal few species with large numbers of individuals and large numbers of species with few individuals.[37][7] Dominance by just a few taxa, such as in the current study, could indicate a stressed system.[38] The organisms that dominated the collections in the survey have been listed by the Georgia State Environmental Protection Division[38] as tolerant and/or partially tolerant of adverse environmental conditions; while the less numerous taxa have been listed as intolerant.

Matthews,[6] in citing results of the ongoing studies on the Savannah River conducted by the Academy of Natural Sciences of Philadelphia, suggested that reductions in the numbers of stonefly nymphs in collections over the years may be correlated with increased pollution loads in the river and that dredging of the channel may have influenced caddisfly abundance. The Environmental Protection Division[38] of the State of Georgia listed the Savannah River at river miles 194.8, 178.2, 158.1 upstream from the VEGP site as being moderately polluted. A site at river mile 156.1 was listed as healthy but not representative of the rest of this reach of the river. Sampling stations below the VEGP were listed as healthy. These facts would place the section of the Savannah River in the vicinity of the VEGP in a transition phase between moderately polluted and healthy conditions. Results of samples taken upstream from the VEGP site in 1980 revealed the presence of organisms with a tolerance to mild pollution.[1] The dominance of the fauna in the current study by a few taxa and the presence of some pollution-intolerant forms, such as Tricorythodes spp., suggests that some degree of stress exists in this reach of the river and that conditions improve downstream from Augusta.[38]

Minimum and maximum values for physicochemical data collected at the time of macroinvertebrate sampling are presented in table 19. Water temperature ranged from 7.5 C to 26.0 C, dissolved oxygen from 6.5 mg/l to 12.3 mg/l, and pH from 5.6 to 7.6. Results of chemical analyses on grab samples taken from the Savannah River are presented in Appendix A. All values are within normal ranges with only ammonia exceeding EPA water quality standards.[39] These chemical results suggested that water quality was improving in this stretch of the river. It should be noted, however, that no analyses for organics or pesticides were made.

Results of an analysis of variance (ANOVA) performed on the data are presented in tables 20 to 23. Due to the lack of replicate samples for baskets, an ANOVA was not performed and only the actual values are presented in table 24. When appropriate, a Duncan's Multiple Range Test was conducted, and the results are presented in table 25.

The ANOVA performed on the multiplate data showed significant station-month interaction which precluded further analysis of differences detected among the main effects.

The ANOVA performed on the Ponar data did not detect significant differences among stations or months for the number of taxa at the 0.05 level of significance. Significant differences were detected for station and month for number of individuals transformed as LOG_{10} (number of individuals + 1). Duncan's Multiple Range Test of Means indicated that the number of individuals collected at Station 150.6C was significantly different from the number of individuals collected at Stations 150.9C and 151.2C. The multiple range test also suggested that the number of individuals collected by Ponars differed on a seasonal basis with more individuals collected in March, May, and November than in remaining months.

Examination of the multiplate data with respect to number of individuals and number of taxa for the east and the west bank indicated that there were more individuals and taxa collected on the east bank than the west, but the difference depended upon the month the sample was taken. An ANOVA was performed on this data and the summary results are presented in tables 26 and 27. No explanation for this pattern can be offered at this time.

Table 28 presents the average stream velocity measurements taken at the time of macroinvertebrate sampling. Velocities ranged from a low of 0.4 ft/s in November at Station 150.9W to a high of 3.8 ft/s in August at Station 151.2W.

The numbers of individuals collected on artificial substrates at Station 150.9W were generally lower throughout the study period than those collected at the other stations. This was most likely due to reduced current velocity at this station. After the station was placed and the January sample collected, the river moved the station floats toward the west bank, and upstream obstructions in the river caused a reduced velocity at this location. The largest reduction in the number of individuals occurred in the Chironomidae and the hydropsychid caddisflies. Many of the Chironomidae and all of the hydropsychids are filter-feeders and depend on adequate current velocity for obtaining sufficient food.[32][9][31][36] Since these two taxa made up a majority of the organisms collected, a large reduction in their numbers due to less than optimum velocity regimes accounts for the lower number of individuals collected at Station 150.9W.

Important Species

Shellfish, of which Corbicula sp. was the only representative collected during this study, are known bioaccumulators of radionuclides. Therefore, Corbicula sp. are "important" species as defined by U.S. Nuclear Regulatory Commission Regulatory Guide 4.2. The feeding mode and distribution of Corbicula sp. in the study area of the Savannah River have already been discussed. Corbicula sp. is, in turn, fed upon by some species of fish (i.e. redear sunfish and some catfish) and by some small mammals (i.e. raccoon and otter). With regard to the life history of

Corbicula sp., they are monoecious, incubatory, and have non-swimming planktotrophic larvae. More thorough discussion of their life history and ecology can be found in Sinclair[40] and Sinclair.[41]

Other taxa which qualified as "important" species under U.S. Nuclear Regulatory Commission Regulatory Guide 4.2 were the Chironomidae and the Hydropsychidae. These two taxa are utilized as major food source items by various game fish in the river or as food source items by non-game fish that are themselves the prey of game species. The utilization of these two taxa as food by fish was expected due to their dominance of the macroinvertebrate fauna in the river. The biology of the Chironomidae and the Hydropsychidae have already been discussed elsewhere in this report.

Station Operation

It is predicted that station operation will have no deleterious effects on the aquatic macroinvertebrate population in the vicinity of the VEGP. This prediction is based on the model of the thermal plume for the VEGP discharge (discussed in Section 5.1.2 VEGP OLSER) in relation to the extent of the overall aquatic habitat of the area, the nature and abundances of the aquatic macroinvertebrates present in the system, and the natural substrates utilized by these organisms. The data collected in the current study do not indicate any individual organisms or groups or organisms that should receive further or special attention in relation to effects of station operation.

CONCLUSIONS

The Savannah River in the vicinity of the VEGP supported a diverse macroinvertebrate community composed of organisms commonly occurring in large southeastern coastal plain rivers. Although many diverse taxa were present, most were represented by few individuals. Several taxa, the Chironomidae, the hydropsychid caddisflies (predominantly Cheumatopsyche spp.), and the Oligochaetes, dominated the aquatic community. Dominance by many individuals of just a few taxa was generally indicative of some degree of stress and did not indicate a "normal" or "healthy" river. The presence of some taxa normally associated with clean water did suggest that conditions may be improving downstream from Augusta.

Seasonal variation in population densities of the aquatic organisms were evident, although the method of sample collection and processing precluded the development of specific life history data. There was no reason to suspect that population cycles would be different from those described in current literature available for the area.

The relative abundances of aquatic organisms collected during the study were greater near the east bank of the river than the west bank. Organism abundance at Station 150.9W was depressed in relation to the other stations due to decreased current velocity.

Statistical analysis of the data (ANOVA) for the artificial substrates indicated that the effects of station location and time of the year on the organisms colonizing the substrates cannot be separated from one another, but that the number of individuals and taxa collected on the east bank stations tend to be greater than the west bank stations. Results of ANOVA tests on the Ponar data were similar to those for the artificial substrates with respect to the total number of individuals present in the substrate. The Ponar ANOVA results also demonstrated that the number of taxa occurring near the river banks and on the bottom throughout the study area were similar. Significant differences detected for the transformed numbers of individuals (LNUM) for the Ponar data may be due to sampling variability or aggregated dispersion of the population.

Important species that occurred in the study area were Corbicula sp., Chironomidae, and Hydropsychidae. There were no species present which should receive special attention due to their uniqueness or position in the food web of the area.

The area of the Savannah River which will be affected by station operation is small in comparison to the overall habitat available to aquatic macroinvertebrates in the ecosystem. It is unlikely, therefore, that station operation will have any overall deleterious effects on the aquatic macroinvertebrate community near the VEGP.

REFERENCES

1. Environmental Protection Division, Water Quality Monitoring Data for Georgia Streams, Department of Natural Resources, Atlanta, Georgia, 1981.

2. Hynes, H. B. N., The Biology of Polluted Waters, Liverpool University Press, Liverpool, England, 1966.

3. Patrick, R., Cairns, J., and Roback, S. S., "An Ecosystematic Study of the Fauna and Flora of the Savannah River," Proceedings of the Academy of Natural Sciences of Philadelphia 118, Philadelphia, Pennsylvania, pp 109-407, 1967.

4. Academy of Natural Sciences of Philadelphia, Summary of Studies on the Savannah River 1951-1970 for E. I. DuPont DeNemours and Company, Academy of Natural Sciences of Philadelphia, Philadelphia, Pennsylvania, 1970.

5. Academy of Natural Sciences of Philadelphia, Summary Reports of Savannah River Cursory Surveys for E. I. DuPont DeNemours and Company 1961-1972, 1974, and 1977, Academy of Natural Sciences of Philadelphia, Philadelphia, Pennsylvania, 1978.

6. Matthews, R. A., Biological Surveys on the Savannah River in the Vicinity of the Savannah River Plant (1951-1976), E. I. DuPont DeNemours and Company, Savannah River Laboratory, Aiken, South Carolina, 1982.

7. Weber, C. I. (ed.), Biological Field and Laboratory Methods for Measuring the Quality of Surface Waters and Effluents, United States Environmental Protection Agency, Cincinnati, Ohio, 1973.

8. Williams, G. E., III, "New Techniques to Facilitate Hand-Picking Macrobenthos," Transactions of the American Microscopial Society 93, pp 220-226, 1974.

9. Merritt, R. W., and Cummins, K. W., An Introduction to the Aquatic Insects of North America, Kendall/Hunt Publishing Company, Dubuque, Iowa, 1978.

10. Edmunds, G. F., Jr., Jensen, S. L., and Berner, L., The Mayflies of North and Central America, University of Minnesota Press, Minneapolis, Minnesota, 1976.

11. Hilsenhoff, W. L., Aquatic Insects of Wisconsin, Wisconsin Department of Natural Resources Bulletin 89, Madison, Wisconsin, 1975.

12. Needham, J. G., and Westfall, M. J., A Manual of the Dragonflies of North America, University of California Press, Berkeley, California, 1954.

REFERENCES (CONTINUED)

13. Parrish, F. K. (ed.), Keys to Water Quality Indicative Organisms, Federal Water Pollution Control Administration, Atlanta, Georgia, 1968.

14. Ross, H. H., "The Caddisflies, or Trichoptera, of Illinois," Illinois Natural History Survey Bulletin 23(1), Urbana, Illinois, 1944.

15. Sinclair, R. M., Water Quality Requirements for the Family Elmidae (Coleoptera), Tennessee Stream Pollution Control Board, Nashville, Tennessee, 1964.

16. Edmondson, G. F. (ed.), Freshwater Biology, John Wiley and Sons, New York, New York, 1959.

17. Wiggins, G. B., Larvae of the North American Caddisfly Genera (Trichoptera), University of Toronto Press, Toronto, Canada, 1977.

18. Cairns, J., Jr. (ed.), Artificial Substrates, Ann Arbor Science Publishers, Incorporated, Ann Arbor, Michigan, 1982.

19. Mason, W. T., Jr., Anderson, J. B., Kreis, R. D., and Johnson, W. C., "Artificial Substrate Sampling, Macroinvertebrates in a Polluted Reach of the Klamanth River, Oregon," Journal of the Water Pollution Control Federation 42, pp 315-328, 1970.

20. Lewis, P. A., Taxonomy and Ecology of Stenonema Mayflies, United States Environmental Protection Agency, Cincinnati, Ohio, 1974.

21. Lemly, A. D., "Modification of Benthic Insect Communities in Polluted Streams: Combined Effects of Sedimentation and Nutrient Enrichment," Hydrobiologia 87, pp 229-245, 1982.

22. Hynes, H. B. N., The Ecology of Running Waters, Liverpool University Press, Liverpool, England, 1970.

23. Georgia Power Company, Edwin I. Hatch Nuclear Plant Annual Environmental Surveillance Report for Calendar Year 1979, Georgia Power Company, Atlanta, Georgia, 1980.

24. Georgia Power Company, Edwin I. Hatch Nuclear Plant Annual Environmental Surveillance Report for Calendar Year 1980, Georgia Power Company, Atlanta, Georgia, 1981.

25. Mason, W. T., Jr., Weber, C. I, Lewis, P. A., and Julian, E. C., "Factors Affecting the Performance of Basket and Multiplate Macroinvertebrate Samplers," Freshwater Biology 3, pp 409-436, 1973.

REFERENCES (CONTINUED)

26. Gardner, J. A., and Woodall, W. R., Plant Yates Biological Study, December, 1976-October, 1977, Georgia Power Company, Atlanta, Georgia, 1978.

27. Mason, W. T., Lewis, P. A., and Anderson, J. B., Macroinvertebrate Collections and Water Quality Monitoring in the Ohio River Basin 1963-1967, United States Environmental Protection Agency, Cincinnati, Ohio, 1971.

28. Gardner, J. A., Woodall, W. R., Staats, A. A., and Napoli, J. F., "The Invasion of the Asiatic Clam (Corbicula manilensis Philippi) in the Altamaha River, Georgia," The Nautilus 90, pp 117-125, 1976.

29. Staats, A. A., and Woodall, W. R., Plant Arkwright Biological Study, November, 1976-October, 1977, Vol. I, Georgia Power Company, Atlanta, Georgia, 1978.

30. Stark, B. P., and Gaufin, A. R., "The Stoneflies (Plecoptera) of Florida," Transactions of the American Entomological Society 104, pp 391-433, 1979.

31. Wallace, J. B., and Merritt, R. W., "Filter-Feeding Ecology of Aquatic Insects," Annual Review of Entomology 25, pp 103-132, 1980.

32. Cudney, M. D., and Wallace, J. B., "Life Cycles, Microdistribution and Production Dynamics of Six Species of Net-Spinning Caddisflies in a Large Southeastern (USA) River," Holarctic Ecology 3, pp 169-182, 1980.

33. Williams, N. E., and Hynes, H. B. N., "Microdistribution and Feeding of the Net-Spinning Caddisflies (Trichoptera) for Canadian Streams," Oikos 24, pp 73-84, 1973.

34. Wallace, J. B., "The Larval Retreat and Food of Arctopsyche; with Phylogenetic Notes on Feeding Adaptations in Hydropsychidae Larvae (Trichoptera)," Annals of the Entomological Society of America 68, pp 167-173, 1975.

35. Wallace, J. B., "Food Partitioning in Net-Spinning Trichopteran Larvae: Hydropsyche venularis, Cheumatopsyche etrona, and Macronema zebratum (Hydropsychidae)," Annals of the Entomological Society of America 68, pp 463-472, 1975.

36. Wallace, J. B., Webster, J. R., and Woodall, W. R., "The Role of Filter Feeders in Flowing Waters," Archiv f. Hydrobiologie 79, pp 506-532, 1977.

REFERENCES (CONTINUED)

37. Wilhm, J. L., "Range of Diversity Index in Benthic Macroinvertebrate Populations," Journal of the Water Pollution Control Federation 42, pp 221-224, 1970.

38. Environmental Protection Division, Water Quality Investigation of the Savannah River Basin in Georgia, Georgia Department of Natural Resources, Atlanta, Georgia, 1974.

39. United States Environmental Protection Agency, Quality Criteria for Water, United States Environmental Protection Agency, Washington, D.C., 1976.

40. Sinclair, R. M., "Effects of an Introduced Clam (Corbicula) on Water Quality in the Tennessee River Valley," Paper Presented Before the Second Annual Sanitary Engineering Conference, Vanderbilt University, Nashville, Tennessee, 1963.

41. Sinclair, R. M., "Annotated Bibliography on the Exotic Bivalve Corbicula in North America, 1900-1971, STERKIANA 43, pp 11-18, 1971.

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TABLE 1 (Page 1 of 2)

NUMBER OF INDIVIDUALS COLLECTED ON
MULTIPLATE SAMPLERS AT VEGP DURING 1981

Taxa	Station 150.6E	150.6W	150.9E	150.9W	151.2E	151.2W
EPHEMEROPTERA	-	7	-	1	8	-
Tricorythodes spp.	41	30	25	52	27	19
Ephemerella spp.	24	11	20	5	15	8
Caenis spp.	11	10	14	-	11	-
Stenonema spp.	100	51	80	30	73	20
Heptageniidae	47	25	25	6	29	16
Pseudiron spp.	-	1	-	-	-	-
Heptagenia spp.	49	31	26	3	32	25
Baetidae	11	4	16	1	16	3
Baetis spp.	44	27	35	3	33	10
Pseudocloeon spp.	-	1	-	-	1	-
ODONATA						
Argia spp.	1	-	-	1	-	-
PLECOPTERA	32	16	12	6	60	13
Perlidae	28	6	21	4	16	5
Helopicus spp.	3	2	-	2	2	1
Taeniopteryx spp.	-	1	1	-	2	-
Perlesta placida	126	55	97	52	73	39
Nemoura spp.	-	-	1	-	-	-
Paragnetina spp.	-	-	3	-	1	-
Acroneuria spp.	-	-	-	-	1	-
Isogenus spp.	1	-	1	1	-	-
Pteronarcys spp.	-	-	1	-	1	-
Isoperla spp.	1	-	-	3	-	1
MEGALOPTERA						
Corydalus spp.	5	24	8	-	12	7
NEUROPTERA						
Climacia spp.	-	-	1	-	3	-
COLEOPTERA						
Elmidae adult	1	-	-	-	-	-
Stenelmis spp. adult	7	3	8	1	19	1
Microcylloepus pusillus adult	-	1	-	-	-	-
Dubiraphia spp. adult	-	-	1	-	-	1
Macronychus glabratus adult	2	1	-	-	1	-
Macronychus glabratus larva	-	-	2	1	5	-
Dineutus spp. larva	1	-	3	2	4	-
Elmidae larva	5	1	-	-	2	-
Stenelmis spp. larva	2	-	-	2	5	1
Ancronyx variegatus larva	2	3	1	4	-	1
Ancronyx variegatus adult	-	-	1	-	-	-
TRICHOPTERA	24	7	4	-	30	-
Chimarra spp.	192	145	274	15	235	64
Polycentropidae	1	-	-	-	-	-
Neureclipsis spp.	27	10	9	21	5	23
Hydropsychidae	156	147	329	11	226	71

TABLE 1 (Page 2 of 2)

Taxa	Station 150.6E	150.6W	150.9E	150.9W	151.2E	151.2W
TRICOPTERA (Con't.)						
Macronema spp.	-	-	1	-	-	-
Hydropsyche spp.	82	23	91	-	64	24
Hydropsyche incommoda	806	421	1158	36	765	339
Hydropsyche rossi	716	224	404	15	423	241
Cheumatopsyche spp.	5843	3822	5802	392	5844	1639
Hydroptila spp.	5	-	-	-	-	-
Hydroptilidae	36	4	1	11	3	-
Leptoceridae	-	-	-	-	1	-
Oecetis spp.	4	3	4	3	1	1
Ceraclea spp.	1	1	-	-	-	-
Nectopsyche spp.	3	-	-	2	1	1
DIPTERA						
Ceratopogonidae	1	-	-	-	-	-
Chironomidae	10507	10830	12628	3230	13408	10627
Simulidae	16	25	12	1	23	99
Empididae	60	59	86	14	83	58
MOLLUSCA						
Gastropoda	1	1	-	5	3	2
Pelecypoda	-	-	1	-	-	-
Ancylidae	-	1	4	2	-	2
ANNELIDA						
Oligochaeta	111	33	44	165	85	24
Polychaeta						
Manyunkia speciosa	-	-	2	1	-	-
ARTHROPODA (Other)						
Isopoda	-	-	1	-	-	-
Hydracarina	6	2	5	2	7	-
Amphipoda	1	-	-	-	-	-
Acarina	7	-	5	1	3	1
PLATYHELMINTHES						
Turbellaria	105	87	31	92	43	31
NEMATODA	25	3	1	1	1	-
RHYNCOCOELA						
Prostoma rubrum	8	5	12	8	21	4
CNIDARIA						
Hydra spp.	-	1	-	2	2	1
BRYOZOA						
Pectinatella spp. (Present)						
Number of Samples	16	16	16	16	16	14
Number of Species	49	44	48	42	49	36
Number of Individuals	19,288	16,165	21,312	4,210	21,729	13,423

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TABLE 2 (Page 1 of 2)

NUMBER OF INDIVIDUALS COLLECTED ON
BASKET SAMPLERS AT VEGP DURING 1981(a)

Taxa	Station 150.6E	150.6W	150.9E	150.9W	151.2E	151.2W
EPHEMEROPTERA	-	1	-	-	-	-
Tricorythodes spp.	9	5	13	11	19	17
Ephemerella spp.	59	13	25	28	33	12
Caenis spp.	1	-	1	-	-	-
Stenonema spp.	28	11	25	13	21	22
Heptageniidae	16	2	8	3	10	9
Heptagenia spp.	14	20	31	9	22	16
Baetidae	16	1	1	2	6	-
Baetis spp.	44	20	52	27	18	3
Pseudocloeon spp.	9	-	17	3	1	1
ODONATA						
Neurocordulia spp.	-	-	-	-	1	-
Anisoptera	-	-	-	-	-	1
PLECOPTERA	43	10	12	23	16	4
Perlidae	43	7	13	10	15	6
Helopicus spp.	-	2	3	1	1	5
Taeniopteryx spp.	6	7	7	5	2	-
Isoperla spp.	-	-	-	-	1	-
Perlesta placida	43	15	51	4	44	24
Isogenus spp.	-	1	6	1	-	1
Pteronarcys spp.	-	1	-	-	-	-
MEGALOPTERA						
Corydalus	1	-	-	-	-	-
COLEOPTERA						
Stenelmis spp. adult	2	-	2	-	1	-
Stenelmis spp. larva	2	-	1	-	-	-
Gyrinus spp. larva	4	-	-	-	-	-
Gyrinidae larva	-	-	-	-	1	-
Ancronyx variegatus larva	-	-	1	2	2	1
Macronychus glabratus larva	-	-	3	-	-	1
TRICHOPTERA	-	3	-	-	1	-
Chimarra spp.	123	28	76	28	134	45
Polycentropidae	-	-	3	1	-	-
Neureclipsis spp.	35	6	21	20	15	6
Hydropsychidae	100	79	92	51	144	126
Hydropsyche spp.	-	4	3	2	1	1
Hydropsyche incommoda	224	166	441	30	313	173
Hydropsyche rossi	128	90	149	14	95	109
Cheumatopsyche spp.	1837	1083	2206	454	2287	1509
Leptoceridae	-	-	-	-	-	1
Hydroptilidae	-	1	1	-	-	-
Oecetis spp.	6	2	-	1	-	1
Pycnopsyche spp.	-	1	-	1	-	-
Brachycentrus sp.	1	-	-	-	1	-

TABLE 2 (Page 2 of 2)

Taxa	Station 150.6E	150.6W	150.9E	150.9W	151.2E	151.2W
DIPTERA						
Chironomidae	7390	3005	6161	3838	4213	1340
Simulidae	9	12	3	4	11	3
Empididae	20	18	14	6	21	15
MOLLUSCA						
Gastropoda	1	-	-	-	-	1
Ancylidae	2	-	-	-	-	-
ANNELIDA						
Oligochaeta	482	36	147	229	166	10
RHYNCOCOELA						
Prostoma rubrum	12	4	7	10	19	5
ARTHROPODA (Other)						
Hydracarina	15	3	-	-	5	1
Acarina	3	2	5	3	-	-
Collembola	-	-	-	1	-	-
PLATYHELMINTHES						
Turbellaria	-	16	5	2	1	5
NEMATODA	-	-	1	1	1	-
BRYOZOA						
Pectinatella spp. (Present)						
Number of Samples	4	4	4	4	4	3
Number of Species	34	35	36	34	35	32
Number of Individuals	10,728	4,676	9,607	4,838	7,642	3,474

a. Totals for January, February, March, and June only.

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TABLE 3 (Page 1 of 2)

NUMBER OF INDIVIDUALS COLLECTED IN
PONAR SAMPLES AT VEGP DURING 1981

Taxa	150.6C	150.9C	151.2C
EPHEMEROPTERA			
Tricorythodes spp.	4	1	2
Ephemerella spp.	12	8	7
Pseudiron spp.	-	-	1
Caenis spp.	11	3	-
Stenonema spp.	25	-	-
Heptageniidae	4	1	-
Pseudocloeon spp.	2	-	-
Baetidae	1	-	-
ODONATA	1	-	3
Coenagrionidae	-	2	-
Dromogomphus spp.	1	3	2
Gomphidae	-	2	-
Neurocordulia spp.	-	-	1
NEUROPTERA			
Climacia spp.	-	-	14
PLECOPTERA	2	4	-
Perlidae	3	-	-
Neoperla spp.	1	-	-
Perlesta placida	5	-	-
HEMIPTERA			
Corixidae	1	-	-
COLEOPTERA			
Hydraena spp.	-	-	1
Stenelmis spp. adult	1	-	-
Stenelmis spp. larva	-	3	2
Elmidae larva	1	-	-
Ancronyx variegatus larva	1	1	3
Macronychus glabratus larva	1	-	2
TRICHOPTERA			
Chimarra spp.	2	14	1
Neureclipsis spp.	-	3	-
Hydropsychidae	1	3	1
Hydropsyche incommoda	-	1	1
Hydropsyche rossi	-	-	1
Cheumatopsyche spp.	88	61	30
Hydroptila spp.	-	1	-
Leptoceridae	2	1	2
Oecetis spp.	1	-	1
Nectopsyche spp.	2	5	5
Ceraclea spp.	2	4	2
DIPTERA			
Chaoborus spp.	1	1	-
Ceratopogonidae	31	69	27
Chironomidae	1392	527	550
Tabanidae	1	-	1
Empididae	2	6	3

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TABLE 3 (Page 2 of 2)

Taxa	150.6C	150.9C	151.2C
MOLLUSCA			
Gastropoda	69	39	77
Ancylidae	39	5	11
Pelecypoda	161	16	67
Corbicula sp.	560	74	142
ANNELIDA			
Oligochaeta	2931	2801	1623
Hirudinea	3	-	2
Polychaeta			
Manayunkia speciosa	4	2	114
ARTHROPODA (Other)			
Cladocera	1	5	6
Ostracoda	-	1	1
Copepoda	3	3	4
Isopoda	1	4	1
Acarina	7	4	-
Hydracarina	17	2	2
Collembola	5	25	35
PLATYHELMINTHES			
Turbellaria	139	21	51
Trematoda	203	55	87
CNIDARIA			
Hydra spp.	1	-	1
RHYNCOCOELA			
Prostoma rubrum	92	67	84
NEMATODA	32	159	58
PORIFERA			
Spongillidae (Present)			
Number of Samples	40	40	40
Number of Species	48	40	42
Number of Individuals	5,870	4,007	3,009

TABLE 4 (Page 1 of 3)

TOTAL NUMBERS WITH PERCENT COMPOSITION (IN PARENTHESIS) OF ORGANISMS COLLECTED ON MULTIPLATE SAMPLERS AT STATION 150.6E DURING 1981

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
EPHEMEROPTERA								
Tricorythodes spp.					1(0.1)	25(0.7)	13(0.6)	2(0.0)
Ephemerella spp.	2(0.1)	14(1.1)	7(0.7)	1(0.1)				
Caenis spp.				2(0.1)	1(0.1)	4(0.1)	4(0.2)	
Stenonema spp.	1(0.1)	3(0.2)		1(0.1)	20(1.1)	18(0.5)	17(0.8)	40(0.6)
Heptageniidae	2(0.1)	2(0.2)	1(0.1)	1(0.1d.	10(0.5)	5(0.1)	10(d.4)	16(0.3)
Pseudiron spp.								
Heptagenia spp.	1(0.1)	3(0.2)	1(0.1)	1(0.1)	14(0.7)	1(0.0)	1(0.0)	27(0.4)
Baetidae	1(0.1)		2(0.2)			1(0.0)	1(0.0)	6(0.1)
Baetis spp.	9(0.6)	1(0.1)	2(0.2)		2(0.1)	9(0.3)	3(0.1)	18(0.3)
Pseudocloeon spp.								
ODONATA								
Argia spp.							1(0.0)	
PLECOPTERA	8(0.5)	15(1.1)	2(0.2)				1(0.0)	6(0.1)
Perlidae		19(1.4)	9(0.9)					
Helopicus spp.			3(0.3)					
Taeniopteryx spp.								
Perlesta placida		2(0.2)	42(4.3)	82(5.2)				
Nemoura spp.								
Paragnetina spp.								
Acroneuria spp.								
Isogenus spp.		1(0.1)						
Pteronarcys spp.								
Isoperla spp.		1(0.1)						
MEGALOPTERA								
Corydalus spp.						1(0.0)		
NEUROPTERA								
Climacia spp.								
COLEOPTERA								
Elmidae adult				1(0.1)				
Stenelmis spp. adult						7(0.2)		
Microcylloepus pusillus adult								

TABLE 4 (Page 2 of 3)

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Dubiraphia spp. adult								
Macronychus glabratus adult		1(0.1)						1(0.0)
Macronychus glabratus larva								
Dineutus spp.						1(0.0)		
Elmidae larva				1(0.1)			4(0.2)	
Stenelmis spp. larva							1(0.0)	1(0.0)
Ancronyx variegatus larva				1(0.1)		1(0.0)		
Ancronyx variegatus adult								
TRICHOPTERA				1(0.1)		18(0.5)	5(0.2)	
Chimarra spp.	7(0.5)	33(2.5)	16(1.6)		8(0.4)	37(1.0)	16(0.7)	75(1.2)
Polycentropidae			1(0.1)					
Neureclipsis spp.	2(0.1)	2(0.2)	3(0.3)			1(0.0)	5(0.2)	14(0.2)
Hydropsychidae	5(0.3)	2(0.2)	4(0.4)	11(0.7)	34(1.8)	84(2.4)	9(0.4)	7(0.1)
Macronema spp.								
Hydropsyche spp.				17(1.1)	6(0.3)	44(1.2)	6(0.3)	9(0.1)
Hydropsyche incommoda	9(0.6)	33(2.5)	24(2.4)	142(9.0)	392(20.9)	132(3.7)	14(0.6)	60(1.0)
Hydropsyche rossi	5(0.3)	7(0.5)	12(1.2)	231(14.6)	315(16.8)	71(2.0)	12(0.5)	63(1.0)
Cheumatopsyche spp.	128(8.6)	163(12.4)	112(11.4)	519(32.8)	785(41.9)	1473(41.7)	436(19.3)	2227(35.4)
Hydroptila spp.				5(0.3)				
Hydroptilidae					1(0.1)	1(0.0)		
Leptoceridae								
Oecetis spp.						1(0.0)	1(0.0)	2(0.0)
Ceraclea spp.							1(0.0)	
Nectopsyche spp.						1(0.0)		2(0.0)
DIPTERA								
Ceratopogonidae		1(0.1)						
Chironomidae	1219(83.4)	990(75.3)	711(72.4)	519(32.8)	277(14.8)	1566(44.4)	1684(74.6)	3541(56.3)
Simulidae	7(0.5)				1(0.1)			
Empididae	6(0.4)	1(0.1)	4(0.4)	3(0.2)	4(0.2)	7(0.2)	11(0.5)	8(0.1)
MOLLUSCA								
Gastropoda		1(0.1)						24(0.4)
Pelecypoda								
Ancylidae								
ANNELIDA								
Oligochaeta	48(3.3)	14(1.1)	23(2.2)	9(0.6)	1(0.1)	11(0.3)		5(0.1)

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TABLE 4 (Page 3 of 3)

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Polychaeta								
Manyunkia speciosa						1		
ARTHROPODA (Other)								
Isopoda								4(0.1)
Hydracarina			2(0.2)					
Amphipoda		1(0.1)				1(0.0)		
Acarina								6(0.1)
PLATYHELMINTHES								
Turbellaria	1(0.1)					2(0.1)		102(1.6)
NEMATODA		4(0.3)					1(0.0)	20(0.3)
RHYNCOCOELA								
Prostoma rubrum	1(0.1)		1(0.1)		2(0.1)			3(0.0)
CNIDARIA								
Hydra spp.	———	———	———	———	———	———	———	———
Total Number of Species	19	24	21	21	17	28	24	27
Total Number of Individuals	1462	1314	982	1583	1872	3529	2257	6289

TABLE 5 (Page 1 of 3)

TOTAL NUMBERS WITH PERCENT COMPOSITION (IN PARENTHESIS) OF ORGANISMS COLLECTED ON MULTIPLATE SAMPLERS AT STATION 150.6W DURING 1981

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
EPHEMEROPTERA							4(0.0)	3(0.0)
Tricorythodes spp.					1(0.0)	18(0.9)	11(0.2)	
Ephemerella spp.	1(0.2)	10(2.1)						
Caenis spp.					1(0.0)	5(0.2)	4(0.0)	
Stenonema spp.		2(0.4)	1(0.2)		9(0.4)	18(0.9)	7(0.1)	14(0.3)
Heptageniidae					2(0.1)	1(0.0)	9(0.2)	13(0.3)
Pseudiron spp.		1(0.2)						
Heptagenia spp.	3(0.6)	4(0.8)		5(0.5)	3(0.1)	1(0.0)	6(0.1)	7(0.2)
Baetidae				2(0.2)				2(0.0)
Baetis spp.		8(1.7)	2(0.4)		3(0.1)	1(0.0)	6(0.1)	7(0.2)
Pseudocloeon spp.	1(0.2)							
ODONATA								
Argia spp.								
PLECOPTERA	1(0.2)	12(2.5)	2(0.4)					1(0.0)
Perlidae		4(0.8)	2(0.4)					
Helopicus spp.			2(0.4)					
Taeniopteryx spp.	1(0.2)							
Perlesta placida		3(0.6)	7(1.4)	45(4.7)				
Nemoura spp.								
Paragnetina spp.								
Acroneuria spp.								
Isogenus spp.								
Pteronarcys spp.								
Isoperla spp.								
MEGALOPTERA								
Corydalus spp.						16(0.8)	8(0.2)	
NEUROPTERA								
Climacia spp.								
COLEOPTERA								
Elmidae adult								
Stenelmis spp. adult						2(0.1)		1(0.0)
Microcylloepus pusillus adult							1(0.0)	

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TABLE 5 (Page 2 of 3)

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Dubiraphia spp. adult							1(0.0)	
Macronychus glabratus adult								
Macronychus glabratus larva								
Dineutus spp. larva							1(0.0)	
Elmidae larva								
Stenelmis spp. larva		1(0.2)				1(0.0)	1(0.0)	
Ancronyx variegatus larva							2(0.0)	5(0.1)
Ancronyx variegatus adult								
TRICHOPTERA								
Chimarra spp.	2(0.4)	8(1.7)	1(0.2)	2(0.2)	12(0.5)	63(3.1)	46(0.9)	11(0.3)
Polycentropidae								
Neureclipsis spp.					1(0.0)		3(0.1)	6(0.1)
Hydropsychidae	2(0.4)	2(0.4)			52(2.3)	42(2.1)	14(0.3)	35(0.8)
Macronema spp.								
Hydropsyche spp.				15(1.6)	4(0.2)	1(0.0)		3(0.1)
Hydropsyche incommoda	6(1.1)	10(2.1)	13(2.6)	51(5.3)	215(9.5)	20(1.0)	52(1.0)	54(1.3)
Hydropsyche rossi	3(0.6)	6(1.2)	8(1.6)	36(3.7)	138(6.1)	10(0.5)	5(0.1)	18(0.4)
Cheumatopsyche spp.	14(2.6)	22(4.5)	38(7.6)	267(27.7)	959(42.4)	744(37.2)	696(13.5)	1082(25.4)
Hydroptila spp.								
Hydroptilidae				2(0.2)	1(0.0)	1(0.0)		
Leptoceridae								
Oecetis spp.						1(0.0)	1(0.0)	1(0.0)
Ceraclea spp.				1(0.1)				
Nectopsyche spp.								
DIPTERA								
Ceratopogonidae								
Chironomidae	493(92.5)	385(79.5)	413(83.1)	520(54.0)	828(36.6)	993(49.6)	4231(82.1)	2967(69.5)
Simulidae		1(0.2)					5(0.1)	19(0.4)
Empididae				2(0.2)	25(1.1)	5(0.2)	18(0.3)	9(0.2)
MOLLUSCA								
Gastropoda				1(0.1)				
Pelecypoda								
Ancylidae							1(0.1)	
ANNELIDA								
Oligochaeta	5(0.9)	5(1.0)	1(4.7)	11(1.1)		4(0.2)	1(0.0)	

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TABLE 5 (Page 3 of 3)

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Polychaeta								
Manyunkia speciosa								
ARTHROPODA (Other)								
Isopoda								
Hydracarina	1(0.2)				1(0.0)			
Amphipoda								
Acarina								
PLATYHELMINTHES								
Turbellaria			1(0.2)		8(0.4)	56(2.8)	21(0.4)	1(0.0)
NEMATODA				2(0.2)				1(0.0)
RHYNCOCOELA								
Prostoma rubrum							4(0.0)	1(0.0)
CNIDARIA								
Hydra spp.				1(0.1)				
Total Number of Species	13	17	13	16	18	20	27	23
Total Number of Individuals	533	484	497	963	2263	2002	5155	4268

TABLE 6 (Page 1 of 3)

TOTAL NUMBERS WITH PERCENT COMPOSITION (IN PARENTHESIS) OF ORGANISMS COLLECTED ON MULTIPLATE SAMPLERS AT STATION 150.9E DURING 1981

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
EPHEMEROPTERA								
Tricorythodes spp.						19(0.4)	6(0.1)	
Ephemerella spp.	1(0.1)	14(1.2)	5(0.5)					
Caenis spp.					1(0.0)	8(0.2)	4(0.1)	1(0.0)
Stenonema spp.	1(0.1)	4(0.4)	1(0.1)		15(0.6)	25(0.5)	16(0.3)	18(0.4)
Heptageniidae	1(0.1)			2(0.1)	2(0.1)	8(0.2)	4(0.1)	8(0.2)
Pseudiron spp.								
Heptagenia spp.	2(0.2)	3(0.3)	1(0.1)	2(0.1)	2(0.1)	1(0.0)		15(0.6)
Baetidae				1(0.1)		6(0.1)	6(0.1)	3(0.1)
Baetis spp.	4(0.4)	4(0.4)	1(0.1)		1(0.1)	10(0.2)	10(0.2)	5(0.1)
Pseudocloeon spp.								
ODONATA								
Argia spp.								
PLECOPTERA		10(0.9)	1(0.1)			1(0.0)		
Perlidae		21(1.9)						
Helopicus spp.								
Taeniopteryx spp.	1(0.1)							
Perlesta placida		3(0.3)	21(2.1)	70(4.0)	2(0.1)		1(0.0)	
Nemoura spp.	1(0.1)							
Paragnetina spp.					1(0.1)	1(0.0)		1(0.1)
Acroneuria spp.								
Isogenus spp.	1(0.1)							
Pteronarcys spp.						1(0.0)		
Isoperla spp.								
MEGALOPTERA								
Corydalus spp.						4(0.1)	4(0.1)	
NEUROPTERA								
Climacia spp.							1(0.0)	
COLEOPTERA								
Elmidae adult								
Stenelmis spp. adult				1(0.1)	3(0.1)	1(0.0)		3(0.1)
Microcylloepus pusillus adult								

TABLE 6 (Page 2 of 3)

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Dubiraphia spp. adult					1(0.0)			
Macronychus glabratus adult								
Macronychus glabratus larva		1(0.1)		1(0.1)				
Dineutus spp. larva					1(0.0)	2(0.0)		
Elmidae larva								
Stenelmis spp. larva								
Ancronyx variegatus larva							1(0.0)	
Ancronyx variegatus adult						1(0.0)		
TRICHOPTERA			1(0.1)		1(0.0)	1(0.0)		1(0.0)
Chimarra spp.	1(0.1)	38(3.4)	9(0.9)	1(0.1)	10(0.4)	72(1.5)	82(1.6)	61(1.5)
Polycentropidae								
Neureclipsis spp.	2(0.2)		2(0.2)				2(0.0)	3(0.1)
Hydropsychidae	3(0.3)	8(0.7)		14(0.8)	164(6.6)	108(2.2)	19(0.4)	13(0.3)
Macronema spp.							1(0.0)	
Hydropsyche spp.				17(1.0)	33(1.3)	34(0.7)	6(0.1)	1(0.0)
Hydropsyche incommoda	22(2.4)	36(3.2)	52(5.2)	203(11.7)	401(16.2)	299(6.1)	58(1.2)	87(2.1)
Hydropsyche rossi	5(0.5)	12(1.1)	22(2.2)	111(6.4)	131(5.3)	54(1.1)	34(0.7)	35(0.8)
Cheumatopsyche spp.	85(9.2)	122(10.8)	81(8.1)	520(29.9)	991(40.0)	1746(35.5)	924(18.5)	1333(32.2)
Hydroptila spp.								
Hydroptilidae				1(0.1)				
Leptoceridae								
Oecetis spp.					1(0.0)	2(0.0)		1(0.0)
Ceraclea spp.								
Nectopsyche spp.								
DIPTERA								
Ceratopogonidae								
Chironomidae	769(83.2)	835(74.2)	786(78.7)	789(45.3)	676(27.3)	2483(50.5)	3773(75.5)	2517(60.9)
Simulidae	3(0.3)	1(0.1)				1(0.0)	4(0.1)	3(0.1)
Empididae	2(0.2)	6(0.5)		4(0.2)	37(1.5)	7(0.1)	23(0.5)	7(0.2)
MOLLUSCA								
Gastropoda								
Pelecypoda			1(0.1)					
Ancylidae							4(0.1)	
ANNELIDA								
Oligochaeta	18(1.9)	4(0.4)	15(1.5)	3(0.2)	2(0.1)	1(0.0)	1(0.0)	

TABLE 6 (Page 3 of 3)

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Polychaeta								
Manyunkia speciosa					1(0.0)	1(0.0)		
ARTHROPODA (Other)								
Isopoda		1(0.1)						
Hydracarina						4(0.1)	1(0.0)	
Amphipoda								
Acarina	2(0.2)	2(0.2)				1(0.0)		
PLATYHELMINTHES								
Turbellaria					2(0.1)	9(0.2)	7(0.1)	13(0.3)
NEMATODA				1(0.1)				
RHYNCOCOELA								
Prostoma rubrum				1(0.1)		2(0.0)	6(0.1)	3(0.1)
CNIDARIA								
Hydra spp.	____	____	____	____	____	____	____	____
Total Number of Species	19	19	15	18	23	31	26	22
Total Number of Individuals	924	1125	999	1742	2479	4913	4998	4132

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TABLE 7 (Page 1 of 3)

TOTAL NUMBERS WITH PERCENT COMPOSITION (IN PARENTHESIS) OF ORGANISMS COLLECTED ON MULTIPLATE SAMPLERS AT STATION 150.9W DURING 1981

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
EPHEMEROPTERA			1(0.2)					
Tricorythodes spp.					27(8.0)	15(3.8)	8(1.2)	2(0.5)
Ephemerella spp.		4(0.4)				1(0.3)		
Caenis spp.								
Stenonema spp.	2(0.4)				21(6.2)	2(0.5)		5(1.2)
Heptageniidae		2(0.2)		2(0.7)	1(0.3)	1(0.3)		
Pseudiron spp.								
Heptagenia spp.	1(0.2)		1(0.2)					1(0.2)
Baetidae							1(0.2)	
Baetis spp.	1(0.2)		1(0.2)					1(0.2)
Pseudocloeon spp.								
ODONATA								
Argia spp.							1(0.2)	
PLECOPTERA	1(0.2)	5(0.5)						
Perlidae								
Helopicus spp.			2(0.3)					
Taeniopteryx spp.								
Perlesta placida		2(0.2)	4(0.7)	45(15.1)	1(0.3)			
Nemoura spp.								
Paragnetina spp.								
Acroneuria spp.								
Isogenus spp.		1(0.1)						
Pteronarcys spp.								
Isoperla spp.		1(0.1)	2(0.3)					
MEGALOPTERA								
Corydalus spp.								
NEUROPTERA								
Climacia spp.								
COLEOPTERA								
Elmidae adult								
Stenelmis spp. adult					1(0.3)			
Microcylloepus pusillus adult								

TABLE 7 (Page 2 of 3)

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Dubiraphia spp. adult								
Macronychus glabratus adult								
Macronychus glabratus larva						1(0.3)		
Dineutus spp. larva						1(0.3)	1(0.2)	
Elmidae larva								
Stenelmis spp. larva							2(0.3)	
Ancronyx variegatus larva					3(0.9)		1(0.2)	
Ancronyx variegatus adult								
TRICHOPTERA								
Chimarra spp.	2(0.4)	7(0.7)	1(0.2)		1(0.3)	1(0.3)		3(0.7)
Polycentropidae								
Neureclipsis spp.		1(0.1)					9(1.4)	11(2.7)
Hydropsychidae	2(0.4)	3(0.3)	1(0.2)		3(0.9)		2(0.3)	
Macronema spp.								
Hydropsyche spp.								
Hydropsyche incommoda	8(1.8)	13(1.2)	3(0.5)	2(0.7)	10(3.0)			
Hydropsyche rossi	2(0.4)	6(0.6)	1(0.2)	3(1.0)	3(0.9)			
Cheumatopsyche spp.	40(8.8)	75(7.1)	30(5.0)	23(7.7)	111(32.9)	28(7.1)	32(4.9)	53(12.8)
Hydroptila spp.								
Hydroptilidae				7(2.3)	2(0.6)	2(0.5)		
Leptoceridae								
Oecetis spp.			1(0.2)	1(0.3)	1(0.3)			
Ceraclea spp.								
Nectopsyche spp.							1(0.2)	1(0.2)
DIPTERA								
Ceratopogonidae								
Chironomidae	389(86.1)	814(77.1)	528(87.7)	195(65.2)	129(38.3)	298(76.0)	566(86.0)	311(75.1)
Simulidae	1(0.2)							
Empididae		1(0.1)		3(1.0)	6(1.8)		3(0.5)	1(0.2)
MOLLUSCA								
Gastropoda					3(0.9)		2(0.3)	
Pelecypoda								
Ancylidae							2(0.3)	
ANNELIDA								
Oligochaeta	3(0.7)	117(11.1)	22(3.7)	10(3.3)	7(2.1)	2(0.5)	2(0.3)	2(0.5)

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TABLE 7 (Page 3 of 3)

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Polychaeta								
Manyunkia speciosa						1(0.3)		
ARTHROPODA (Other)								
Isopoda								
Hydracarina			2(0.7)					
Amphipoda								
Acarina			1(0.2)					
PLATYHELMINTHES								
Turbellaria			1(0.2)	1(0.3)	7(2.1)	37(9.4)	24(3.6)	22(5.3)
NEMATODA				1(0.3)				
RHYNCOCOELA								
Prostoma rubrum				4(1.3)		2(0.5)	1(0.2)	1(0.2)
CNIDARIA								
Hydra spp.				2(0.7)				
Total Number of Species	12	16	17	14	18	14	17	13
Total Number of Individuals	452	1056	602	299	337	392	658	414

TABLE 8 (Page 1 of 3)

TOTAL NUMBERS WITH PERCENT COMPOSITION (IN PARENTHESIS) OF ORGANISMS COLLECTED ON MULTIPLATE SAMPLERS AT STATION 151.2E DURING 1981

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
EPHEMEROPTERA							8(0.1)	
Tricorythodes spp.						11(0.3)	15(0.3)	1(0.0)
Ephemerella spp.	3(0.2)	6(0.5)	4(0.4)				1(0.0)	1(0.0)
Caenis spp.							10(0.2)	1(0.0)
Stenonema spp.		2(0.2)		1(0.0)	17(0.7)	16(0.5)	14(0.2)	23(0.5)
Heptageniidae	1(0.1)			3(0.1)	1(0.0)			24(0.5)
Pseudiron spp.								
Heptagenia spp.			3(0.3)	3(0.1)	12(0.5)	2(0.1)	6(0.1)	6(0.1)
Baetidae					3(0.1)		1(0.1)	12(0.2)
Baetis spp.	6(0.7)	2(0.2)		2(0.1)	3(0.1)	7(0.2)	13(0.2)	
Pseudocloeon spp.		1(0.1)						
ODONATA								
Argia spp.								
PLECOPTERA	4(0.5)	52(4.8)	2(0.2)	1(0.0)				1(0.0)
Perlidae	1(0.1)	8(0.7)	6(0.6)	1(0.0)				
Helopicus spp.			2(0.2)					
Taeniopteryx spp.	2(0.2)							
Perlesta placida		6(0.5)	15(1.6)	51(2.3)			1(0.0)	
Nemoura spp.								
Paragnetina spp.						1(0.0)		
Acroneuria spp.					1(0.0)			
Isogenus spp.								
Pteronarcys spp.					1(0.0)			
Isoperla spp.								
MEGALOPTERA								
Corydalus spp.						4(0.1)	7(0.1)	1(0.0)
NEUROPTERA								
Climacia spp.						3(0.1)		
COLEOPTERA								
Elmidae adult								
Stenelmis spp. adult		1(0.1)			1(0.0)	6(0.2)	9(0.2)	2(0.0)
Microcylloepus pusillus adult								

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TABLE 8 (Page 2 of 3)

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Dubiraphia spp. adult								
Macronychus glabratus adult							1(0.0)	
Macronychus glabratus larva					2(0.1)	1(0.0)	1(0.0)	1(0.0)
Dineutus spp. larva						4(0.1)		
Elmidae larva				1(0.0)			1(0.0)	
Stenelmis spp. larva		1(0.1)					3(0.1)	1(0.0)
Ancronyx variegatus larva								
Ancronyx variegatus adult								
TRICHOPTERA				4(0.2)	24(1.0)		1(0.0)	1(0.0)
Chimarra spp.	3(0.3)	29(2.7)	6(0.6)	2(0.1)	14(0.6)	67(2.0)	80(1.4)	34(0.7)
Polycentropidae								
Neureclipsis spp.					1(0.0)		4(0.1)	
Hydropsychidae		7(0.6)		46(2.1)	129(5.2)	34(1.0)		10(0.2)
Macronema spp.								
Hydropsyche spp.				12(0.5)	17(0.7)	8(0.2)		27(0.5)
Hydropsyche incommoda	16(1.8)	36(3.3)	43(4.6)	139(6.3)	238(9.5)	150(4.6)	86(1.5)	57(1.1)
Hydropsyche rossi	2(0.2)	5(0.5)	11(1.2)	111(5.1)	203(8.1)	30(0.9)	32(0.5)	29(0.6)
Cheumatopsyche spp.	69(7.8)	129(11.8)	74(7.9)	552(25.1)	1118(44.7)	1587(48.5)	958(16.6)	1357(26.7)
Hydroptila spp.								
Hydroptilidae					2(0.1)	1(0.0)		
Leptoceridae							1(0.0)	
Oecetis spp.								1(0.0)
Ceraclea spp.								
Nectopsyche spp.							1(0.0)	
DIPTERA								
Ceratopogonidae								
Chironomidae	763(86.1)	778(71.2)	734(78.0)	1248(56.9)	691(27.6)	1322(40.4)	4458(77.4)	3414(67.2)
Simulidae	3(0.3)	1(0.1)				3(0.1)	7(0.1)	9(0.2)
Empididae	2(0.2)	9(0.8)	2(0.2)	3(0.1)	19(0.8)	7(0.2)	19(6.3)	22(0.4)
MOLLUSCA								
Gastropoda						1(0.0)		2(0.0)
Pelecypoda								
Ancylidae								
ANNELIDA								
Oligochaeta	11(1.2)	18(1.6)	38(4.0)	9(0.4)	2(0.1)	1(0.0)	4(0.1)	2(0.0)

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TABLE 8 (Page 3 of 3)

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Polychaeta								
Manyunkia speciosa								
ARTHROPODA (Other)								
Isopoda								
Hydracarina		1(0.1)						6(0.1)
Amphipoda								
Acarina			1(0.1)			1(0.0)	1(0.0)	
PLATYHELMINTHES								
Turbellaria					1(0.0)	3(0.1)	14(0.2)	25(0.5)
NEMATODA						1(0.0)		
RHYNCOCOELA								
Prostoma rubrum				5(0.2)		3(0.1)	4(0.1)	9(0.2)
CNIDARIA								
Hydra spp.		1(0.1)		1(0.0)				
Total Number of Species	14	20	14	20	22	26	30	28
Total Number of Individuals	886	1093	941	2195	2500	3274	5761	5079

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TOTAL NUMBERS WITH PERCENT COMPOSITION (IN PARENTHESIS) OF ORGANISMS COLLECTED ON MULTIPLATE SAMPLERS AT STATION 151.2W DURING 1981

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
EPHEMEROPTERA								
Tricorythodes spp.					1(0.1)	8(0.3)	4(0.1)	6(0.2)
Ephemerella spp.		5(0.9)	3(0.5)					
Caenis spp.								
Stenonema spp.					1(0.1)	1(0.0)	8(0.2)	10(0.3)
Heptageniidae		1(0.2)		4(0.3)		2(0.1)	3(0.1)	6(0.2)
Pseudiron spp.								
Heptagenia spp.		1(0.2)	4(0.6)	1(0.1)	7(0.7)	1(0.0)	2(0.1)	9(0.2)
Baetidae						1(0.0)		2(0.1)
Baetis spp.		3(0.5)			3(0.3)		3(0.1)	1(0.0)
Pseudocloeon spp.								
ODONATA								
Argia spp.								
PLECOPTERA		7(1.2)	2(0.3)	1(0.1)				3(0.1)
Perlidae		3(0.5)	2(0.3)					
Helopicus spp.			1(0.2)					
Taeniopteryx spp.								
Perlesta placida			5(0.8)	34(2.9)				
Nemoura spp.								
Paragnetina spp.								
Acroneuria spp.								
Isogenus spp.								
Pteronarcys spp.								
Isoperla spp.			1(0.2)					
MEGALOPTERA								
Corydalus spp.						3(0.1)	4(0.1)	
NEUROPTERA								
Climacia spp.								
COLEOPTERA								
Elmidae adult								
Stenelmis spp. adult				1(0.1)				
Microcylloepus pusillus adult								

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Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Dubiraphia spp. adult						1(0.0)		
Macronychus glabratus adult								
Macronychus glabratus larva								
Dineutus spp. larva								
Elmidae larva								
Stenelmis spp. larva					1(0.1)			
Ancronyx variegatus larva			1(0.2)					
Ancronyx variegatus adult								
TRICHOPTERA								
Chimarra spp.		5(0.9)	3(0.5)			20(0.9)	28(0.7)	8(0.2)
Polycentropidae								
Neureclipsis spp.				2(0.2)		1(0.0)	2(0.1)	18(0.5)
Hydropsychidae		1(0.2)		42(3.6)	9(0.9)	18(0.8)		1(0.0)
Macronema spp.								
Hydropsyche spp.			1(0.2)	12(1.0)		2(0.1)	9(0.2)	
Hydropsyche incommoda		14(2.4)	15(2.4)	49(4.2)	94(9.0)	85(3.7)	46(1.1)	36(1.0)
Hydropsyche rossi		7(1.2)	4(0.6)	43(3.7)	142(13.7)	24(1.0)	9(0.2)	12(0.3)
Cheumatopsyche spp.		55(9.4)	24(3.8)	58(4.9)	117(11.3)	651(282)	327(82)	407(11.0)
Hydroptila spp.								
Hydroptilidae								
Leptoceridae								
Oecetis spp.								1(0.0)
Ceraclea spp.								
Nectopsyche spp.						1(0.0)		
DIPTERA								
Ceratopogonidae								
Chironomidae		475(80.8)	547(87.1)	917(77.8)	631(61.1)	1457(63.2)	3488(87.4)	3112(84.1)
Simulidae				9(0.8)	8(0.8)	14(0.6)	28(0.7)	40(1.1)
Empididae		5(0.9)	1(0.2)	2(0.2)	18(1.7)	10(0.4)	15(0.4)	7(0.2)
MOLLUSCA								
Gastropoda		1(0.2)						1(0.0)
Pelecypoda								
Ancylidae						2(0.1)		
ANNELIDA								
Oligochaeta		4(0.7)	13(2.1)	3(0.3)	1(0.1)	2(0.1)		1(0.0)

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Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Polychaeta								
Manyunkia speciosa								
ARTHROPODA (Other)								
Isopoda								
Hydracarina								
Amphipoda								
Acarina			1(0.2)					
PLATYHELMINTHES								
Turbellaria						1(0.0)	12(0.3)	18(0.5)
NEMATODA								
RHYNCOCOELA								
Prostoma rubrum		1(0.2)					1(0.0)	2(0.1)
CNIDARIA								
Hydra spp.								1(0.0)
Total Number of Species		16	17	15	13	21	17	22
Total Number of Individuals		588	628	1178	1033	2305	3989	3702

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TABLE 10 (Page 1 of 2)

TOTAL NUMBERS WITH PERCENT COMPOSITION (IN PARENTHESIS) OF ORGANISMS COLLECTED ON BASKET SAMPLERS AT STATION 150.6E DURING 1981

Taxa	Jan.	Feb.	Mar.	Jun.
EPHEMEROPTERA				
Tricorythodes spp.				9(0.5)
Ephemerella spp.	38(0.5)	11(1.2)	10(1.5)	
Caenis spp.	1(0.0)			
Stenonema spp.	7(0.1)	3(0.3)	2(0.3)	16(0.9)
Heptageniidae	3(0.0)	6(0.6)	1(0.1)	6(0.3)
Heptagenia spp.	11(0.2)	3(0.3)		
Baetidae	16(0.2)			
Baetis spp.	35(0.5)	5(0.5)	1(0.1)	3(0.2)
Pseudocloeon spp.	9(0.1)			
ODONATA				
Neurocordulia spp.				
Anisoptera				
PLECOPTERA	32(0.4)	7(0.8)	4(0.6)	
Perlidae	5(0.1)	20(2.2)	18(2.6)	
Helopicus spp.				
Taeniopteryx spp.	6(0.1)			
Isoperla spp.				
Perlesta placida		7(0.8)	35(5.1)	1(0.1)
Isogenus spp.				
Pteronarcys spp.				
MEGALOPTERA				
Corydalus spp.				1(0.1)
COLEOPTERA				
Stenelmis spp. adult				2(0.1)
Stenelmis spp. larva	1(0.0)	1(0.1)		
Gyrinus spp. larva				4(0.2)
Gyrinidae larva				
Ancronyx variegatus larva				
Macronychus glabratus larva				
TRICHOPTERA				
Chimarra spp.	65(0.9)	27(2.9)	9(1.3)	22(1.2)

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Taxa	Jan.	Feb.	Mar.	Jun.
Polycentropidae				
Neureclipsis spp.	10(0.1)	10(1.1)	6(0.9)	9(0.5)
Hydropsychidae	27(0.4)	12(1.3)	2(0.3)	59(3.3)
Hydropsyche spp.				
Hydropsyche incommoda	39(0.5)	7(0.8)	5(0.7)	173(9.6)
Hydropsyche rossi	32(0.4)		6(0.9)	90(5.0)
Cheumatopsyche spp.	442(6.1)	155(16.7)	81(11.8)	1159(64.0)
Leptoceridae				
Hydroptilidae				
Oecetis spp.		2(0.2)	1(0.1)	3(0.2)
Pycnopsyche spp.				
Brachycentrus spp.	1(0.0)			
DIPTERA				
Chironomidae	6032(82.6)	614(66.2)	501(72.7)	243(13.4)
Simulidae	7(0.1)		1(0.1)	1(0.1)
Empididae	13(0.2)	2(0.2)		5(0.3)
MOLLUSCA				
Gastropoda				1(0.1)
Ancylidae	1(0.0)			1(0.1)
ANNELIDA				
Oligochaeta	446(6.1)	33(3.6)	3(0.4)	
RHYNCOCOELA				
Prostoma rubrum	8(0.1)	2(0.2)		2(0.1)
ARTHROPODA (Other)				
Hydracarina	14(0.2)	1(0.1)		
Acarina			3(0.4)	
Collembola				
PLATYHELMINTHES				
Turbellaria				
NEMATODA				
Total Number of Species	26	20	18	21
Total Number of Individuals	7301	928	689	1810

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TOTAL NUMBERS WITH PERCENT COMPOSITION (IN PARENTHESIS) OF ORGANISMS COLLECTED ON BASKET SAMPLERS AT STATION 150.6W DURING 1981

Taxa	Jan.	Feb.	Mar.	Jun.
EPHEMEROPTERA				1(0.1)
Tricorythodes spp.				5(0.3)
Ephemerella spp.	3(0.2)	3(0.6)	7(1.0)	
Caenis spp.				
Stenonema spp.	1(0.1)	1(0.2)		9(0.6)
Heptageniidae			1(0.1)	1(0.1)
Heptagenia spp.	2(0.1)	6(1.2)	1(0.1)	11(0.7)
Baetidae				1(0.1)
Baetis spp.	14(0.7)	3(0.6)	1(0.1)	2(0.1)
Pseudocloeon spp.				
ODONATA				
Neurocordulia spp.				
Anisoptera				
PLECOPTERA	4(0.2)	2(0.4)	4(0.6)	
Perlidae		4(0.8)	3(0.4)	
Helopicus spp.			2(0.3)	
Taeniopteryx spp.	7(0.4)			
Isoperla spp.				
Perlesta placida			15(2.1)	
Isogenus spp.		1(0.2)		
Pteronarcys spp.				1(0.1)
MEGALOPTERA				
Corydalus spp.				
COLEOPTERA				
Stenelmis spp. adult				
Stenelmis spp. larva				
Gyrinus spp. larva				
Gyrinidae larva				
Ancronyx variegatus larva				
Macronychus glabratus larva				
TRICHOPTERA				3(0.2)
Chimarra spp.	7(0.4)	10(2.0)	4(0.6)	7(0.5)

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Taxa	Jan.	Feb.	Mar.	Jun.
Polycentropidae				
Neureclipsis spp.	1(0.1)	1(0.2)	1(0.1)	3(0.2)
Hydropsychidae	1(0.1)	4(0.8)	1(0.1)	73(4.7)
Hydropsyche spp.				4(0.3)
Hydropsyche incommoda	14(0.7)	5(1.0)	18(2.6)	129(8.3)
Hydropsyche rossi	7(0.4)	7(1.4)	6(0.9)	70(4.5)
Cheumatopsyche spp.	86(4.4)	67(13.7)	64(9.4)	866(55.9)
Leptoceridae				
Hydroptilidae		1(0.2)		
Oecetis spp.				2(0.1)
Pycnopsyche spp.	1(0.1)			
Brachycentrus spp.				
DIPTERA				
Chironomidae	1761(90.8)	366(74.8)	557(79.7)	321(20.7)
Simulidae	5(0.3)	1(0.2)		6(0.4)
Empididae		2(0.4)		16(1.0)
MOLLUSCA				
Gastropoda				
Ancylidae				
ANNELIDA				
Oligochaeta	18(0.9)	5(1.0)	13(1.9)	
RHYNCOCOELA				
Prostoma rubrum	4(0.2)			
ARTHROPODA (Other)				
Hydracarina	3(0.2)			
Acarina			1(0.1)	1(0.1)
Collembola	1(0.1)			
PLATYHELMINTHES				
Turbellaria				
NEMATODA				
Total Number of Species	19	18	17	22
Total Number of Individuals	1940	489	699	1548

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TABLE 12 (Page 1 of 2)

TOTAL NUMBERS WITH PERCENT COMPOSITION (IN PARENTHESIS) OF ORGANISMS COLLECTED ON BASKET SAMPLERS AT STATION 150.9E DURING 1981

Taxa	Jan.	Feb.	Mar.	Jun.
EPHEMEROPTERA				
Tricorythodes spp.				13(0.5)
Ephemerella spp.	5(0.1)	5(0.6)	15(1.6)	
Caenis spp.				1(0.0)
Stenonema spp.	3(0.1)		1(0.1)	21(0.8)
Heptageniidae		2(0.3)	4(0.4)	2(0.1)
Heptagenia spp.	7(0.1)	3(0.4)	6(0.6)	15(0.5)
Baetidae		1(0.1)		
Baetis spp.	44(0.9)	1(0.1)		7(0.3)
Pseudocloeon spp.	16(0.3)	1(0.1)		
ODONATA				
Neurocordulia spp.				
Anisoptera				
PLECOPTERA	8(0.2)		4(0.4)	
Perlidae		4(0.5)	9(0.9)	
Helopicus spp.			3(0.3)	
Taeniopteryx spp.	7(0.1)			
Isoperla spp.				
Perlesta placida		3(0.4)	46(4.8)	2(0.1)
Isogenus spp.	4(0.1)	2(0.3)		
Pteronarcys spp.				
MEGALOPTERA				
Corydalus spp.				
COLEOPTERA				
Stenelmis spp. adult				2(0.1)
Stenelmis spp. larva				1(0.0)
Gyrinus spp. larva				
Gyrinidae larva				
Ancronyx variegatus larva				1(0.0)
Macronychus glabratus larva	1(0.0)			2(0.1)
TRICHOPTERA				
Chimarra spp.	33(0.6)	3(0.4)	15(1.6)	25(0.9)

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Taxa	Jan.	Feb.	Mar.	Jun.
Polycentropidae				3(0.1)
Neureclipsis spp.	7(0.1)	1(0.1)	2(0.2)	11(0.4)
Hydropsychidae		2(0.3)	4(0.4)	86(3.1)
Hydropsyche spp.				3(0.1)
Hydropsyche incommoda	54(1.0)	12(1.5)	17(1.8)	358(12.9)
Hydropsyche rossi	16(0.3)	8(1.0)	8(0.8)	117(4.2)
Cheumatopsyche spp.	331(6.5)	111(14.0)	135(14.1)	1629(58.6)
Leptoceridae				
Hydroptilidae				1(0.0)
Oecetis spp.				
Pycnopsyche spp.				
Brachycentrus spp.				
DIPTERA				
Chironomidae	4412(86.9)	620(78.4)	667(69.7)	462(16.6)
Simulidae		1(0.1)	1(0.1)	1(0.0)
Empididae	5(0.1)	2(0.3)	1(0.1)	6(0.2)
MOLLUSCA				
Gastropoda				
Ancylidae				
ANNELIDA				
Oligochaeta	119(2.3)	8(1.0)	18(1.9)	2(0.1)
RHYNCOCOELA				
Prostoma rubrum	3(0.1)			4(0.1)
ARTHROPODA (Other)				
Hydracarina				
Acarina	4(0.1)	1(0.1)		
Collembola				
PLATYHELMINTHES				
Turbellaria				5(0.2)
NEMATODA			1(0.1)	
Total Number of Species	19	20	19	26
Total Number of Individuals	5079	791	957	2780

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TOTAL NUMBERS WITH PERCENT COMPOSITION (IN PARENTHESIS) OF ORGANISMS COLLECTED ON BASKET SAMPLERS AT STATION 150.9W DURING 1981

Taxa	Jan.	Feb.	Mar.	Jun.
EPHEMEROPTERA				
Tricorythodes spp.				11(3.5)
Ephemerella spp.	16(0.5)	9(1.1)	2(0.8)	1(0.3)
Caenis spp.				
Stenonema spp.	4(0.1)	2(0.2)	2(0.8)	5(1.6)
Heptageniidae	1(0.0)	2(0.2)		
Heptagenia spp.	6(0.2)	3(0.4)		
Baetidae	2(0.1)			
Baetis spp.	25(0.7)	2(0.2)		
Pseudocloeon spp.	3(0.1)			
ODONATA				
Neurocordulia spp.				
Anisoptera				
PLECOPTERA	17(0.5)	5(0.6)	1(0.4)	
Perlidae	1(0.0)	5(0.6)	4(1.5)	
Helopicus spp.			1(0.5)	
Taeniopteryx spp.	5(0.1)			
Isoperla spp.				
Perlesta placida		1(0.1)	3(1.1)	
Isogenus spp.	1(0.0)			
Pteronarcys spp.				
MEGALOPTERA				
Corydalus spp.				
COLEOPTERA				
Stenelmis spp. adult				
Stenelmis spp. larva				
Gyrinus spp. larva				
Gyrinidae larva				
Ancronyx variegatus larva				2(0.6)
Macronychus glabratus larva				
TRICHOPTERA				
Chimarra spp.	14(0.4)	10(1.2)	3(1.1)	1(0.3)

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Taxa	Jan.	Feb.	Mar.	Jun.
Polycentropidae				1(0.3)
Neureclipsis spp.	3(0.1)	1(0.1)	2(0.8)	14(4.4)
Hydropsychidae	25(0.7)	13(1.6)		13(4.1)
Hydropsyche spp.	1(0.0)		1(0.4)	
Hydropsyche incommoda	23(0.7)	6(0.7)		1(0.3)
Hydropsyche rossi	10(0.3)	3(0.4)		1(0.3)
Cheumatopsyche spp.	142(4.1)	92(11.0)	19(7.2)	201(63.8)
Leptoceridae				
Hydroptilidae				
Oecetis spp.			1(0.4)	
Pycnopsyche spp.		1(0.1)		
Brachycentrus spp.				
DIPTERA				
Chironomidae	2972(86.8)	605(72.4)	207(78.1)	54(17.1)
Simulidae	4(0.1)			
Empididae	2(0.1)	1(0.1)		3(1.0)
MOLLUSCA				
Gastropoda				
Ancylidae				
ANNELIDA				
Oligochaeta	133(3.9)	75(9.0)	19(7.2)	2(0.6)
RHYNCOCOELA				
Prostoma rubrum	6(0.2)			4(1.3)
ARTHROPODA (Other)				
Hydracarina				
Acarina	3(0.1)			
Collembola	1(0.0)			
PLATYHELMINTHES				
Turbellaria	1(0.0)			1(0.3)
NEMATODA	1(0.0)			
Total Number of Species	27	18	13	16
Total Number of Individuals	3422	836	265	315

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TOTAL NUMBERS WITH PERCENT COMPOSITION (IN PARENTHESIS) OF ORGANISMS COLLECTED ON BASKET SAMPLERS AT STATION 151.2E DURING 1981

Taxa	Jan.	Feb.	Mar.	Jun.
EPHEMEROPTERA				
Tricorythodes spp.	1(0.0)			18(0.6)
Ephemerella spp.	7(0.2)	12(1.5)	14(1.5)	
Caenis spp.				
Stenonema spp.	1(0.0)	3(0.4)	4(0.4)	13(0.4)
Heptageniidae	2(0.1)	4(0.5)		4(0.1)
Heptagenia spp.	3(0.1)	5(0.6)	7(0.8)	7(0.2)
Baetidae	4(0.1)		1(0.1)	1(0.0)
Baetis spp.	12(0.4)	6(0.8)		
Pseudocloeon spp.	1(0.0)			
ODONATA				
Neurocordulia spp.				1(0.0)
Anisoptera				
PLECOPTERA	6(0.2)	9(1.1)	1(0.1)	
Perlidae	2(0.1)	6(0.8)	7(0.8)	
Helopicus spp.			1(0.1)	
Taeniopteryx spp.	2(0.1)			
Isoperla spp.			1(0.1)	
Perlesta placida		10(1.3)	32(3.5)	2(0.1)
Isogenus spp.				
Pteronarcys spp.				
MEGALOPTERA				
Corydalus spp.				
COLEOPTERA				
Stenelmis spp. adult			1(0.1)	
Stenelmis spp. larva				
Gyrinus spp. larva				
Gyrinidae larva			1(0.1)	
Ancronyx variegatus larva			1(0.1)	1(0.0)
Macronychus glabratus larva				
TRICHOPTERA			1(0.1)	
Chimarra spp.	28(0.9)	22(2.8)	17(1.9)	67(2.3)

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Taxa	Jan.	Feb.	Mar.	Jun.
Polycentropidae				
Neureclipsis spp.	2(0.1)	2(0.3)	6(0.7)	5(0.2)
Hydropsychidae	6(0.2)	6(0.8)	5(0.5)	127(4.3)
Hydropsyche spp.				1(0.0)
Hydropsyche incommoda	33(1.1)	14(1.8)	19(2.1)	247(8.5)
Hydropsyche rossi	10(0.3)	5(0.6)	11(1.2)	69(2.4)
Cheumatopsyche spp.	230(7.6)	134(16.9)	152(16.6)	1771(60.6)
Leptoceridae				
Hydroptilidae				
Oecetis spp.				
Pycnopsyche spp.				
Brachycentrus spp.	1(0.0)			
DIPTERA				
Chironomidae	2511(83.4)	548(69.3)	586(64.0)	568(19.4)
Simulidae	8(0.3)		1(0.1)	2(0.1)
Empididae	7(0.2)	4(0.5)	5(0.5)	5(0.2)
MOLLUSCA				
Gastropoda				
Ancylidae				
ANNELIDA				
Oligochaeta	122(4.1)	1(0.1)	40(4.4)	3(0.1)
RHYNCOCOELA				
Prostoma rubrum	7(0.2)		2(0.2)	10(0.3)
ARTHROPODA (Other)				
Hydracarina	5(0.2)			
Acarina				
Collembola				
PLATYHELMINTHES				
Turbellaria				1(0.0)
NEMATODA	1(0.0)			
Total Number of Species	25	17	24	21
Total Number of Individuals	3012	791	916	2923

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TOTAL NUMBERS WITH PERCENT COMPOSITION (IN PARENTHESIS) OF ORGANISMS COLLECTED ON BASKET SAMPLERS AT STATION 151.2W DURING 1981

Taxa	Jan.	Feb.	Mar.	Jun.
EPHEMEROPTERA				
Tricorythodes spp.				17(0.7)
Ephemerella spp.		2(0.4)	10(1.8)	
Caenis spp.				
Stenonema spp.			1(0.2)	21(0.9)
Heptageniidae		1(0.2)	2(0.4)	6(0.2)
Heptagenia spp.			3(0.5)	13(0.5)
Baetidae				
Baetis spp.		1(0.2)		2(0.1)
Pseudocloeon spp.				1(0.0)
ODONATA				
Neurocordulia spp.				
Anisoptera				1(0.0)
PLECOPTERA		1(0.2)	3(0.5)	
Perlidae			6(1.1)	
Helopicus spp.			5(0.9)	
Taeniopteryx spp.				
Isoperla spp.				
Perlesta placida			24(4.2)	
Isogenus spp.		1(0.2)		
Pteronarcys spp.				
MEGALOPTERA				
Corydalus spp.				
COLEOPTERA				
Stenelmis spp. adult				
Stenelmis spp. larva				
Gyrinus spp. larva				
Gyrinidae larva				
Ancronyx variegatus larva				1(0.0)
Macronychus glabratus larva				1(0.0)
TRICHOPTERA				
Chimarra spp.		13(2.8)	9(1.6)	23(0.9)

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Taxa	Jan.	Feb.	Mar.	Jun.
Polycentropidae				
Neureclipsis spp.		1(0.2)		5(0.2)
Hydropsychidae		5(1.1)	6(1.1)	115(4.7)
Hydropsyche spp.		1(0.2)		
Hydropsyche incommoda		8(1.7)	17(3.0)	148(6.1)
Hydropsyche rossi		2(0.4)	5(0.9)	102(4.2)
Cheumatopsyche spp.		77(16.5)	79(14.0)	1353(55.5)
Leptoceridae				1(0.0)
Hydroptilidae				
Oecetis spp.				1(0.0)
Pycnopsyche spp.				
Brachycentrus spp.				
DIPTERA				
Chironomidae		342(73.1)	393(69.4)	605(24.8)
Simulidae				3(0.1)
Empididae		2(0.4)	3(0.5)	10(0.4)
MOLLUSCA				
Gastropoda				1(0.0)
Ancylidae				
ANNELIDA				
Oligochaeta		9(1.9)		1(0.0)
RHYNCOCOELA				
Prostoma rubrum		2(0.4)		3(0.1)
ARTHROPODA (Other)				
Hydracarina				1(0.0)
Acarina				
Collembola				
PLATYHELMINTHES				
Turbellaria				5(0.2)
NEMATODA				
Total Number of Species		16	15	25
Total Number of Individuals		468	566	2440

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TOTAL NUMBERS WITH PERCENT COMPOSITION (IN PARENTHESIS) OF ORGANISMS COLLECTED IN PONAR SAMPLES AT STATION 150.6C DURING 1981

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
EPHEMEROPTERA								
Tricorythodes spp.	1(0.3)				2(0.5)	1(0.2)		
Ephemerella spp.	11(3.4)		1(0.1)					
Pseudiron spp.			1(0.1)	1(0.1)				
Caenis spp.	11(3.4)							
Stenonema spp.					1(0.3)	7(1.1)		17(3.7)
Heptageniidae								4(0.9)
Psuedocloen spp.								
Baetidae					1(0.3)			
ODONATA							1(0.1)	
Coenagrionidae								
Dromogomphus spp.		1(0.4)						
Gomphidae								
Neurocordulia spp.								
NEUROPTERA								
Climacia spp.								
PLECOPTERA		1(0.4)						1(0.2)
Perlidae			2(0.2)	1(0.1)				
Neoperla spp.					1(0.3)			
Perlesta placida			3(0.2)		2(0.5)			
HEMIPTERA								
Corixidae				1(0.1)				
COLEOPTERA								
Hydraena spp.								
Stenelmis spp. adult						1(0.2)		
Stenelmis spp. larva								
Elmidae larva	1(0.3)							
Ancronyx variegatus larva				1(0.1)				
Macronychus glabratus larva	1(0.3)							
TRICHOPTERA								
Chimarra spp.			1(0.1)					1(0.2)
Neureclipsis spp.								

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Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Hydropsychidae	1(0.3)							
Hydropsyche incommoda								
Hydropsyche rossi								
Cheumatopsyche spp.	6(1.9)		2(0.2)	8(0.6)	3(0.8)	3(0.5)	4(0.4)	62(13.4)
Hydroptila spp.								
Leptoceridae			2(0.2)					
Oecetis spp.								1(0.2)
Nectopsyche spp.	2(0.6)							
Ceraclea spp.			2(0.2)					
DIPTERA								
Chaoborus spp.		1(0.4)						
Ceratopogonidae	3(0.9)	4(1.7)	14(1.1)		3(0.8)	2(0.3)	1(0.1)	4(0.9)
Chironomidae	65(20.2)	48(20.1)	46(3.6)	158(11.0)	38(9.8)	56(8.5)	892(91.8)	89(19.2)
Tabanidae								1(0.2)
Empididae	1(0.3)		1(0.1)					
MOLLUSCA								
Gastropoda	5(1.6)		9(0.7)		9(2.3)	23(3.5)	2(0.2)	21(4.5)
Ancylidae	24(7.5)			1(0.1)	3(0.8)	4(0.6)		7(1.5)
Pelecypoda			34(2.7)	43(3.0)		5(0.8)	75(6.9)	4(0.9)
Corbicula sp.	21(6.5)	18(7.5)	38(3.0)	89(6.2)	116(29.8)	153(23.1)	25(2.3)	100(21.6)
ANNELIDA								
Oligochaeta	111(34.6)	150(62.8)	1053(83.0)	899(62.6)	175(45.0)	376(56.9)	80(7.3)	87(18.8)
Hirudinea								3(0.6)
Polychaeta								
Manyunkia speciosa	3(0.9)		1(0.1)					
ARTHROPODA (Other)								
Cladocera			1(0.1)					
Ostracoda								
Copepoda	1(0.3)		1(0.1)				1(0.1)	
Isopoda		1(0.4)						
Acarina				1(0.1)	2(0.5)			4(0.9)
Hydracarina			8(0.6)			1(0.2)		8(1.7)
Collembola					1(0.3)			4(0.9)
PLATYHELMINTHES								
Turbellaria	13(4.0)	1(0.4)	22(1.7)	32(2.2)	30(7.7)	6(0.9)	6(0.5)	29(6.3)

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Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Trematoda		8(3.3)		188(13.1)		7(1.1)		
CNIDARIA								
Hydra spp.			1(0.1)					
RHYNCOCOELA								
Prostoma rubrum	32(10.0)		21(1.7)	10(0.7)	2(0.5)	15(22.7)		12(2.6)
NEMATODA	8(2.5)	6(2.5)	5(0.4)	3(0.2)		1(0.2)	4(0.4)	5(1.1)
Total Number of Species	20	11	23	15	16	16	11	21
Total Number of Individuals	321	239	1269	1436	389	661	1091	464

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TOTAL NUMBERS WITH PERCENT COMPOSITION (IN PARENTHESIS) OF ORGANISMS COLLECTED IN PONAR SAMPLES AT STATION 150.9C DURING 1981

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
EPHEMEROPTERA								
Tricorythodes spp.							1(0.5)	
Ephemerella spp.	5(0.9)		2(0.1)					1(0.5)
Pseudiron spp.								
Caenis spp.			2(0.1)					
Stenonema spp.								
Heptageniidae	1(0.2)							
Psuedocloeon spp.								
Baetidae								
ODONATA								
Coenagrionidae	1(0.2)						1(0.5)	
Dromogomphus spp.		2(0.7)					1(0.5)	
Gomphidae			1(0.0)				1(0.5)	
Neurocordulia spp.								
NEUROPTERA								
Climacia spp.								
PLECOPTERA	4(0.7)							
Perlidae								
Neoperla spp.								
Perlesta placida								
HEMIPTERA								
Corixidae								
COLEOPTERA								
Hydraena spp.								
Stenelmis spp. adult								
Stenelmis spp. larva		1(0.3)				1(0.4)	1(0.5)	
Elmidae larva								
Ancronyx variegatus larva				1(0.4)				
Macronychus glabratus larva								
TRICHOPTERA								
Chimarra spp.	14(2.5)							
Neureclipsis spp.	3(0.5)							

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Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Hydropsychidae	3(0.5)							
Hydropsyche incommoda	1(0.2)							
Hydropsyche rossi								
Cheumatopsyche spp.	53(9.4)		1(0.0)				1(0.5)	6(2.8)
Hydroptila spp.							1(0.5)	
Leptoceridae							1(0.5)	
Oecetis spp.								
Nectopsyche spp.	2(0.4)		1(0.0)				1(0.5)	1(0.5)
Ceraclea spp.			3(0.1)	1(0.4)				
DIPTERA								
Chaoborus spp.					1(0.4)			
Ceratopogonidae	16(2.8)	3(0.1)	10(0.5)	6(2.2)	1(0.4)	11(4.8)	8(4.4)	14(6.6)
Chironomidae	82(14.5)	16(5.2)	218(10.8)	21(7.7)	30(13.5)	34(14.8)	96(53.3)	30(14.2)
Tabanidae								
Empididae	2(0.4)	3(1.0)	1(0.0)					
MOLLUSCA								
Gastropoda	22(3.9)	3(1.0)	1(0.0)	2(0.7)			6(3.3)	5(2.4)
Ancylidae	5(0.9)							
Pelecypoda			9(0.4)	2(0.7)		3(1.3)	2(1.1)	
Corbicula sp.	13(2.3)			8(2.9)	4(1.8)	29(12.7)	11(6.1)	9(4.3)
ANNELIDA								
Oligochaeta	290(51.3)	133(43.5)	1727(85.5)	214(78.7)	181(81.2)	111(48.5)	45(25.0)	100(47.4)
Hirudinea								
Polychaeta								
Manyunkia speciosa		1(0.3)		1(0.4)				
ARTHROPODA (Other)								
Cladocera		4(1.3)					1(0.5)	
Ostracoda			1(0.0)					
Copepoda		2(0.7)	1(0.0)					
Isopoda			3(1.0)	1(0.4)				
Acarina		1(0.3)	2(0.1)					1(0.5)
Hydracarina						1(0.4)	1(0.5)	
Collembola					1(0.4)			24(11.4)
PLATYHELMINTHES								
Turbellaria	16(2.8)			3(1.1)	1(0.4)			1(0.5)

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Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Trematoda		6(2.0)	15(0.7)	1(0.4)		33(14.4)		
CNIDARIA								
Hydra spp.								
RHYNCOCOELA								
Prostoma rubrum	28(5.0)	10(3.3)	14(0.7)	8(2.9)	1(0.4)	4(1.8)	1(0.5)	1(0.5)
NEMATODA	4(0.7)	121(39.5)	9(0.4)	4(1.5)	2(0.9)	2(0.9)		17(8.1)
Total Number of Species	20	14	19	13	10	10	18	14
Total Number of Individuals	565	306	2021	272	223	229	180	211

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TOTAL NUMBERS WITH PERCENT COMPOSITION (IN PARENTHESIS) OF ORGANISMS COLLECTED IN PONAR SAMPLES AT STATION 151.2C DURING 1981

Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
EPHEMEROPTERA								
Tricorythodes spp.					2(1.9)			
Ephemerella spp.	5(1.6)	2(0.4)						
Pseudiron spp.	1(0.3)							
Caenis spp.								
Stenonema spp.								
Heptageniidae								
Psuedocloeon spp.								
Baetidae								
ODONATA						1(0.4)	2(1.6)	
Coenagrionidae								
Dromogomphus spp.		1(0.2)						
Gomphidae								
Neurocordulia spp.	1(0.3)							
NEUROPTERA								
Climacia spp.				1(0.4)		13(5.5)		
PLECOPTERA								
Perlidae								
Neoperla spp.								
Perlesta placida								
HEMIPTERA								
Corixidae								
COLEOPTERA								
Hydraena spp.								
Stenelmis spp. adult								
Stenelmis spp. larva				1(0.4)			1(0.8)	
Elmidae larva								
Ancronyx variegatus larva				1(0.4)		1(0.4)	1(0.8)	
Macronychus glabratus larva				1(0.4)				1(0.2)
TRICHOPTERA								
Chimarra spp.	1(0.3)							
Neureclipsis spp.								

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Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Hydropsychidae	1(0.3)							
Hydropsyche incommoda				1(0.4)				
Hydropsyche rossi				1(0.4)				
Cheumatopsyche spp.	20(6.5)	1(0.2)		6(2.5)	2(1.9)	1(0.4)		
Hydroptila spp.								
Leptoceridae	2(0.6)							
Oecetis spp.		1(0.2)						
Nectopsyche spp.	1(0.3)			4(1.7)				
Ceraclea spp.				1(0.4)		1(0.4)		
DIPTERA								
Chaoborus spp.								
Ceratopogonidae	6(1.9)	3(0.6)	4(0.5)		1(1.0)	5(2.1)	3(2.3)	3(0.5)
Chironomidae	101(32.6)	10(2.1)	6(0.7)	21(8.8)	3(2.9)	7(3.0)	45(34.9)	353(53.2)
Tabanidae								1(0.2)
Empididae	3(1.0)							
MOLLUSCA								
Gastropoda	14(4.5)		10(1.2)	1(0.4)	3(2.9)	27(11.4)	3(2.3)	19(2.9)
Ancylidae	10(3.2)					1(0.4)		
Pelecypoda		17(3.6)		2(0.8)		5(2.1)	2(1.5)	13(2.0)
Corbicula sp.	18(5.8)	8(1.7)	12(1.5)	13(5.4)	17(16.3)	25(10.5)	12(9.3)	36(5.4)
ANNELIDA								
Oligochaeta	79(25.5)	377(80.2)	747(91.8)	80(33.3)	73(70.2)	67(28.3)	39(30.2)	138(20.8)
Hirudinea							1(0.8)	1(0.2)
Polychaeta								
Manyunkia speciosa	3(1.0)	6(1.3)	6(0.7)	22(9.2)		37(15.6)	1(0.8)	39(5.9)
ARTHROPODA (Other)								
Cladocera		2(0.4)		1(0.4)	3(2.9)			
Ostracoda								
Copepoda	1(0.3)		3(0.4)					
Isopoda						1(0.4)		
Acarina								
Hydracarina	1(0.3)			1(0.4)				
Collembola	1(0.3)							34(5.1)
PLATYHELMINTHES								
Turbellaria	12(3.9)					31(13.1)	2(1.5)	6(0.9)

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Taxa	Jan.	Feb.	Mar.	May	Jun.	Aug.	Sep.	Nov.
Trematoda	2(0.6)	19(4.0)		64(26.7)		2(0.8)		
CNIDARIA								
Hydra spp.				1(0.4)				
RHYNCOCOELA								
Prostoma rubrum	16(5.2)	17(3.6)	6(0.7)	4(1.7)		8(3.4)	16(12.4)	17(2.6)
NEMATODA	11(3.5)	6(1.3)	20(2.5)	13(5.4)		4(1.7)	1(0.8)	3(0.5)
Total Number of Species	33	14	9	21	8	18	14	14
Total Number of Individuals	310	470	814	240	104	237	129	664

TABLE 19

MINIMUM AND MAXIMUM VALUES FOR PHYSICOCHEMICAL DATA OBTAINED AT THE TIME OF MACROINVERTEBRATE SAMPLING

Station	Water Temperature (°C)	Air Temperature (°C)	Dissolved Oxygen (mg/l)	pH
150.6E	26.0 - 10.0	32.0 - 12.5	11.2 - 6.7	7.3 - 6.2
150.6W	26.0 - 7.5	33.0 - 14.5	11.4 - 6.5	7.6 - 6.4
150.9E	26.0 - 7.0	29.0 - 7.5	11.5 - 6.6	7.2 - 6.6
150.9W	26.0 - 7.5	29.0 - 13.5	12.3 - 6.5	7.2 - 6.5
151.2E	25.0 - 7.5	26.0 - 10.0	11.4 - 6.7	7.2 - 5.6
151.2W(a)	25.0 - 12.0	27.0 - 14.0	9.3 - 6.9	7.3 - 6.2

a. No measurements were made in January.

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TABLE 20

AVERAGE VALUES AND ANALYSIS OF VARIANCE FOR THE VARIABLE LNUM FOR THE MULTIPLATE SAMPLERS IN 1981

Averages:

		150.6		150.9		151.2		Monthly
	N	E	W	E	W	E	W	Averages
JAN	10	2.86	2.42	2.65	2.33	2.63	(a)	2.58
FEB	12	2.82	2.38	2.75	2.70	2.72	2.47	2.64
MAR	12	2.69	2.40	2.70	2.48	2.64	2.48	2.56
MAY	12	2.90	2.66	2.94	2.18	3.04	2.77	2.75
JUN	12	2.97	3.05	3.09	2.23	3.10	2.71	2.86
AUG	12	3.24	3.00	3.39	2.28	3.21	3.05	3.02
SEP	12	2.83	3.40	3.39	2.50	3.45	3.30	3.14
NOV	12	3.39	3.33	3.31	2.31	3.39	3.27	3.17
		2.96	2.83	3.03	2.38	3.02	2.86	

LNUM Mean = 2.85
Std. Dev. = 0.144

Analysis of Variance:

Source	df	ss	ms	f
Station	5	4.789	0.958	45.96*
Month	7	5.007	0.715	34.32*
Station*Month	34	2.965	0.087	4.18*
Error	47	0.980	0.021	
Total	93	13.741		

a. = Station missing.
* = Significant for $\alpha = 0.001$

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TABLE 21

AVERAGE VALUES AND ANALYSIS OF VARIANCE FOR NUMBER OF TAXA COLLECTED BY MULTIPLATE SAMPLERS IN 1981

Averages:

		150.6		150.9		151.2		Monthly
	N	E	W	E	W	E	W	Averages
JAN	10	14.50	8.50	13.50	9.00	10.50	(a)	11.20
FEB	12	18.00	13.00	15.00	12.50	16.50	13.00	14.67
MAR	12	17.50	10.50	11.50	11.50	11.50	11.50	12.33
MAY	12	14.50	11.50	12.00	11.50	14.00	13.00	12.75
JUN	12	14.50	14.50	17.50	15.00	16.50	10.50	14.75
AUG	12	22.00	17.00	23.00	10.00	21.00	15.50	18.08
SEP	12	16.00	22.50	20.50	12.00	24.50	14.50	18.33
NOV	12	23.50	18.50	17.00	10.00	20.50	18.50	17.92
		17.56	14.50	16.25	11.44	16.88	12.06	

Numind Mean = 15.09
Std. Dev. = 2.92

Analysis of Variance:

Source	df	ss	ms	f
Station	5	441.392	88.167	10.32*
Month	7	666.940	95.277	11.39*
Station*Month	34	492.542	14.487	1.69***
Error	47	402.000	8.583	
Total	93	2002.874		

a. = Station missing.
* = Significant for $\alpha = 0.001$
*** = Significant for $\alpha = 0.05$

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TABLE 22

AVERAGE VALUES AND ANALYSIS OF VARIANCE FOR THE VARIABLE LNUM OF THE PONAR DREDGE SAMPLES OF 1981

Averages:

	150.6	150.9	151.2	Monthly Averages
JAN	1.62	1.90	1.47	1.66
FEB	1.59	1.65	1.67	1.64
MAR	2.20	2.48	1.84	2.17
MAY	2.38	1.55	1.63	1.85
JUN	1.80	1.52	1.24	1.52
AUG	2.03	1.58	1.60	1.74
SEP	2.01	1.54	1.35	1.63
NOV	1.87	1.62	2.04	1.84
	1.94	1.73	1.61	

LNUM Mean = 1.76
Std. Dev. = 0.44

Analysis of Variance:

Source	df	ss	ms	f
Station	2	2.238	1.119	5.71***
Month	7	4.280	0.611	3.12***
Station*Month	14	4.432	0.317	1.62NS
Error	96	18.805	0.196	
Total	119	29.755		

*** = Significant for $\alpha = 0.05$
NS = No Significant Difference

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TABLE 23

AVERAGE VALUES AND ANALYSIS OF VARIANCE FOR THE
NUMBER OF TAXA COLLECTED BY PONAR DREDGE SAMPLES IN 1981

Averages:

	150.6	150.9	151.2	Monthly Averages
JAN	9.00	8.20	8.60	8.60
FEB	4.80	5.60	6.40	5.60
MAR	8.20	6.80	4.80	6.60
MAY	6.80	5.80	7.20	6.60
JUN	6.20	3.80	3.80	4.60
AUG	6.60	4.80	7.60	6.33
SEP	5.60	6.00	5.60	5.73
NOV	8.20	5.40	7.20	6.93
	6.93	5.80	6.40	

NUMSP Mean = 6.38
Std. Dev. = 3.28

Analysis of Variance:

Source	df	ss	ms	f
Station	2	25.350	12.675	1.18NS
Month	7	142.925	20.418	1.90NS
Station*Month	14	77.050	5.504	0.51NS
Error	96	1030.800	10.738	
Total	119	1276.125		

NS = No Significant Difference

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TABLE 24

TABLE OF MEAN VALUES FOR LNUM, NUMBER OF TAXA, AND
NUMBER OF INDIVIDUALS COLLECTED BY BASKET SAMPLERS DURING 1981

LNUM:

		150.6		150.9		151.2		Monthly
	N	E	W	E	W	E	W	Averages
JAN	5	3.86	3.29	3.71	3.53	3.48	(a)	3.57
FEB	6	2.97	2.69	2.90	2.92	2.90	2.67	2.84
MAR	6	2.84	2.85	2.98	2.42	2.96	2.75	2.80
JUN	6	3.26	3.19	3.44	2.50	3.47	3.39	3.21
		3.23	3.00	3.28	2.85	3.20	2.94	

LNUM Mean = 3.09

NUMSP:

		150.6		150.9		151.2		Monthly
	N	E	W	E	W	E	W	Averages
JAN	5	26.00	19.00	19.00	27.00	25.00	(a)	23.20
FEB	6	20.00	18.00	20.00	18.00	17.00	16.00	18.17
MAR	6	18.00	17.00	19.00	13.00	24.00	15.00	17.67
JUN	6	21.00	22.00	26.00	16.00	21.00	25.00	21.83
		21.25	19.00	21.00	18.50	21.75	18.67	

NUMSP Mean = 20.09

NUMIND:

		150.6		150.9		151.2		Monthly
	N	E	W	E	W	E	W	Averages
JAN	5	7301.00	1940.00	5079.00	3422.00	3012.00	(a)	4150.80
FEB	6	928.00	489.00	791.00	836.00	791.00	468.00	717.17
MAR	6	689.00	699.00	957.00	265.00	916.00	566.00	682.00
JUN	6	1810.00	1548.00	2780.00	315.00	2923.00	2440.00	1969.33
		2682.00	1169.00	2401.75	1209.50	1910.50	1158.00	

NUMIND Mean = 1781.08

a. = Station missing.

TABLE 25

DUNCAN'S MULTIPLE RANGE TEST FOR
LNUM BY STATION FOR PONAR SAMPLES

α Level = 0.05 DF = 96 MS = 0.19589

Station	N	LNUM $\bar{x}$
150.6C	40	1.94
150.9C	40	1.73
151.2C	40	1.60

The means for Stations 150.9C and 151.2C were not found to be significantly different. Station 150.6C was significantly different from the two other stations.

DUNCAN'S MULTIPLE RANGE TEST FOR
LNUM BY MONTH FOR PONAR SAMPLES

α Level = 0.05 DF = 96 MS = 0.19589

Month	N	LNUM $\bar{x}$
January	15	1.66
February	15	1.64
March	15	2.17
May	15	1.85
June	15	1.52
August	15	1.74
September	15	1.63
November	15	1.84

The following groupings are of months whose mean values are not significantly different:

A.	March	B.	May	February
	May		November	September
	November		August	June
			January	

VEGP - OLSER

TABLE 26

SUMMARY RESULTS FOR ANALYSIS OF VARIANCE
FOR NUMBER OF TAXA (IN PARENTHESIS) FOR
EAST VS. WEST BANK MULTIPLATE SAMPLERS

Month	Result (α =0.05)	Interaction
01/81	E(12.83)>W(8.75)	Not Significant
02/81	E(16.50)>W(12.83)	Not Significant
03/81	No Difference	Not Significant
05/81	No Difference	Not Significant
06/81	No Difference	Not Significant
08/81	E(22.0)>W(14.17)	Not Significant
09/81	Interaction Only	Significant
11/81	E(20.33)>W(15.5)	Not Significant

VEGP - OLSER

TABLE 27

SUMMARY RESULTS FOR ANALYSIS OF VARIANCE
FOR THE VARIABLE LNUM (IN PARENTHESIS) FOR
EAST VS. WEST BANK MULTIPLATE SAMPLERS

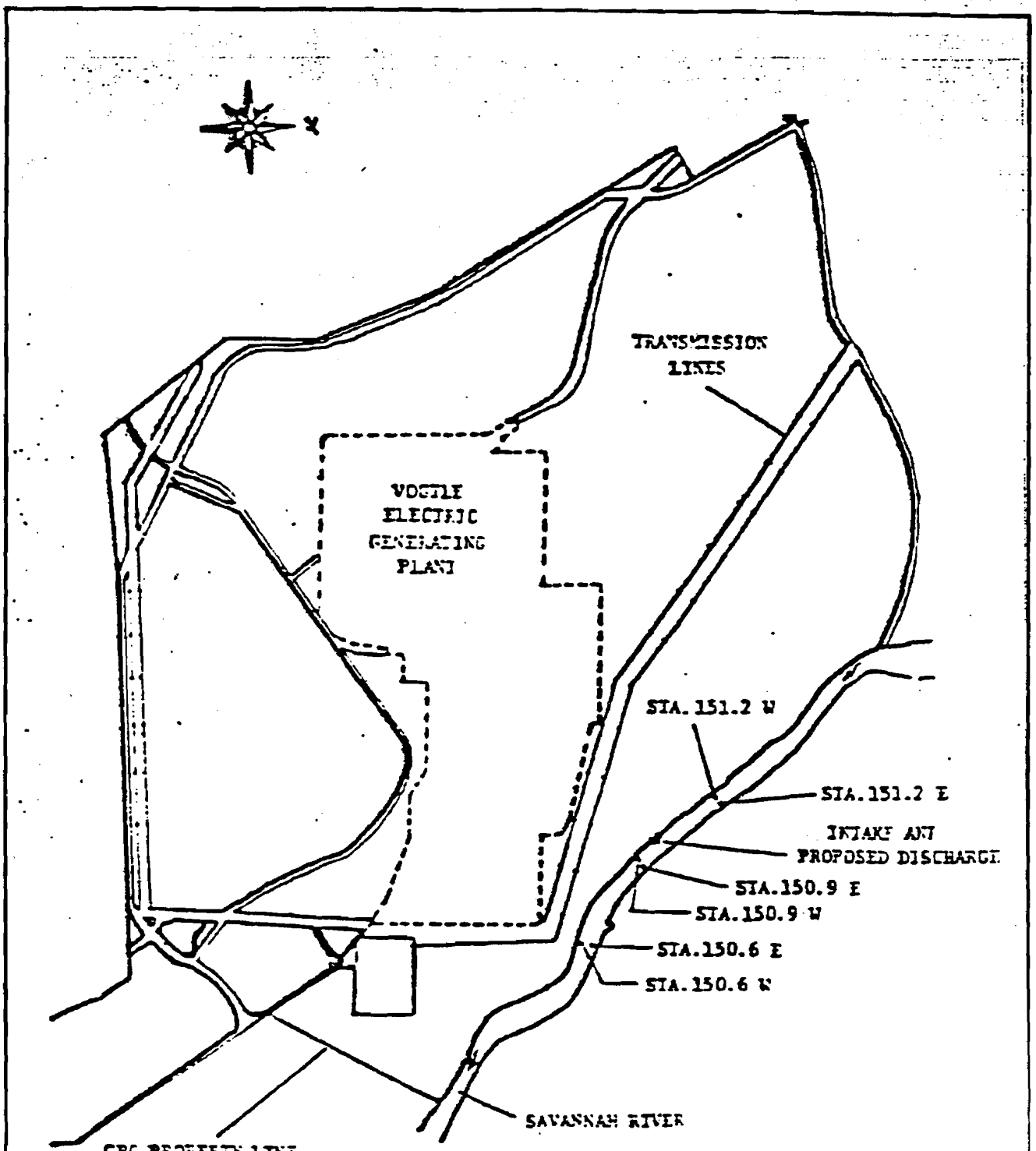
Month	Result	Interaction
01/81	E(2.71)>W(2.37)	Not Significant
02/81	E(2.76)>W(2.52)	Not Significant
03/81	E(2.68)>W(2.45)	Not Significant
05/81	E(2.96)>W(2.54)	Interaction Consistent
06/81	E(3.05)>W(2.67)	Significant
08/81	E(3.28)>W(2.78)	Significant
09/81	E(3.22)=W(3.07)	Significant
11/81	E(3.37)>W(2.97)	Significant

VEGP - OLSER

TABLE 28

AVERAGE STREAM VELOCITY MEASUREMENTS (cm/s)
TAKEN AT THE TIME OF MACROINVERTEBRATE SAMPLING

Date	150.6E	150.6W	150.9E	150.9W	151.2E	151.2W
01/14/81	68.6	75.9	80.5	72.9	77.7	-
02/24/81	50.5	53.4	81.8	27.1	72.7	73.4
03/31/81	47.8	57.1	58.0	15.7	84.0	79.9
05/13/81	56.4	76.0	76.5	38.8	74.7	81.2
06/30/81	66.3	67.8	80.9	24.5	67.6	94.4
08/11/81	51.8	70.1	81.5	18.9	78.1	114.9
09/23/81	45.8	68.0	81.9	13.8	79.0	78.8
11/03/81	52.5	61.2	73.3	11.5	62.7	72.2



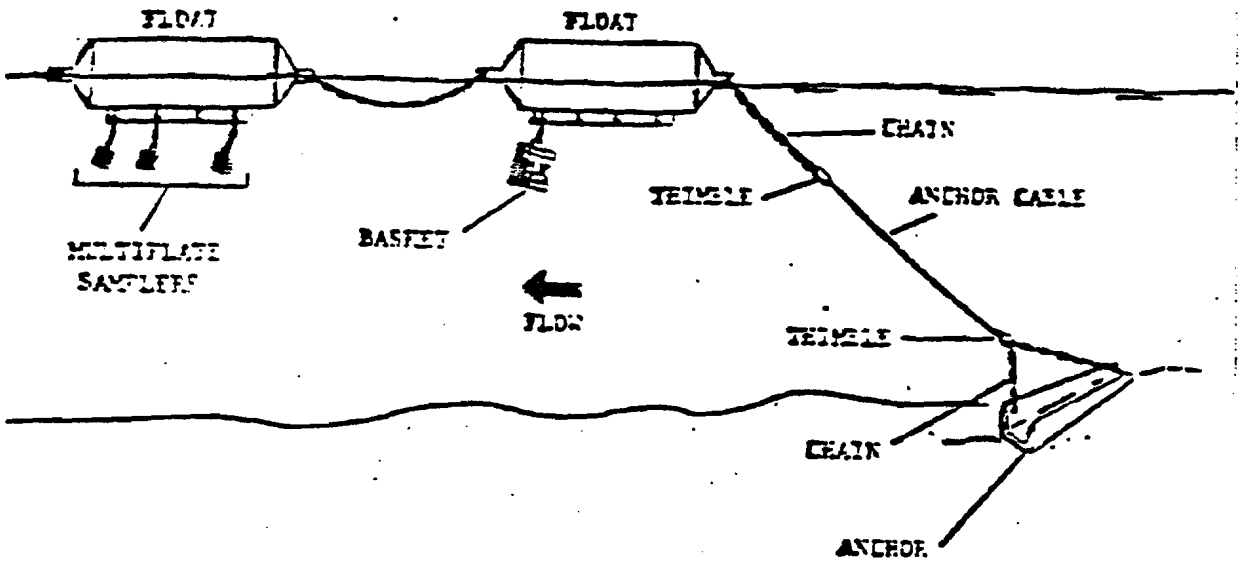
Georgia Power

VOGTLE
ELECTRIC GENERATING PLANT
UNIT 1 AND UNIT 2

BENTHIC SAMPLING STATIONS
(NOT DRAWN TO SCALE)

FIGURE 1

433-9



Georgia Power VOGTLE ELECTRIC GENERATING PLANT UNIT 1 AND UNIT 2	DIAGRAM OF BENTHIC STATION FIGURE 2

433-9

APPENDIX A

Interoffice Communication

Georgia Power

Central Laboratory
5131 Maner Road
Smyrna, Georgia 30080

February 13, 1981

SAVANNAH RIVER
Chemical Analysis

Mr. B. L. Maulsby:

Following is the analysis from the second round of Savannah River monitoring at Plant Vogtle. Samples were collected January 14, and received January 19, 1981. No parameters appear unusually high or low.

		150.6E	150.6W	150.9E	150.9W	151.2E	151.2W
pH	@23°C	7.11	7.00	7.00	7.09	7.08	7.15
M Alkalinity	mg/l $CaCO_3$	19.0	20.5	19.8	20.0	19.3	20.0
Hardness	mg/l $CaCO_3$	14.39	14.68	14.56	14.52	14.56	14.56
Conductivity	µmhos	72.5	72.0	74.5	73.4	74.8	73.5
Turbidity	NTU	0.7	0.7	0.8	6.0	5.2	5.6
Sodium	mg/l Na	8.5	8.5	8.8	8.7	9.0	9.0
Potassium	mg/l K	1.5	1.5	1.6	1.4	1.5	1.5
Calcium	mg/l Ca	4.0	4.1	4.0	4.0	4.0	4.0
Magnesium	mg/l Mg	1.07	1.08	1.11	1.10	1.11	1.11
Iron	mg/l Fe	0.45	0.48	0.41	0.39	0.38	0.38
Manganese	mg/l Mn	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silica	mg/l SiO_2	7.5	8.0	8.0	7.8	7.7	7.6
Chloride	mg/l Cl	6.52	6.62	6.57	6.25	6.41	6.41
Orthophosphate	mg/l P	0.063	0.065	0.054	0.072	0.072	0.068
Total Phosphate	mg/l P	0.070	0.072	0.074	0.080	0.078	0.084
Nitrate	mg/l N	*	0.795	0.715	0.241	0.460	0.466
Ammonia	mg/l N	0.222	0.408	0.031	0.428	0.380	0.035

* This sample appears to have been inadvertently acidified with nitric acid.

Faun D. Scott

JBS:dft

xc: Mr. W. R. Woodall, Jr.

700026

Interoffice Communication

Georgia Power

Central Laboratory
5131 Maner Road
Smyrna, Georgia 30080

March 25, 1981

SAVANNAH RIVER
Chemical Analysis

Mr. B. L. Maulsby:

The following six samples were analyzed as part of the routine monitoring program at Plant Vogtle. Samples were collected February 24 and received February 27, 1981. No parameters are unusually high or low.

		150.6E	150.6W	150.9E	150.9W	151.2E	151.2W
pH	@20°C	6.91	6.91	6.88	6.89	6.90	6.87
M Alkalinity	mg/l CaCO	19.0	19.2	19.5	19.7	19.5	19.3
Hardness	mg/l CaCO	16.97	16.93	16.89	16.89	16.93	16.93
Conductivity	mhos	87.4	87.5	87.0	88.4	86.0	86.0
Turbidity	NTU	12	14	13	13	13	14
Sodium	mg/l Na	10.1	9.8	9.8	9.7	9.5	9.5
Potassium	mg/l K	1.41	1.39	1.39	1.37	1.37	1.36
Calcium	mg/l Ca	4.9	4.9	4.9	4.9	4.9	4.9
Magnesium	mg/l Mg	1.15	1.14	1.13	1.13	1.14	1.14
Iron	mg/l Fe	0.76	0.67	0.87	0.69	0.73	0.65
Manganese	mg/l Mn	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silica	mg/l SiO	10.5	10.3	10.1	10.2	10.2	10.1
Chloride	mg/l Cl	9.09	8.70	8.28	8.12	7.69	7.90
Orthophosphate	mg/l P	0.056	0.049	0.049	0.075	0.054	0.050
Total Phosphate	mg/l P	0.073	0.075	0.077	0.077	0.075	0.080
Nitrate	mg/l N	0.240	0.184	0.238	0.209	0.224	0.186
Ammonia	mg/l N	0.015	0.013	0.011	0.268	0.013	0.040

Fain D. Scott

JBS:dft

xc: Mr. W. R. Woodall, Jr.

700026

Interoffice Communication Georgia Power

Central Laboratory
5131 Maner Road
Smyrna, Georgia 30080

April 23, 1981

SAVANNAH RIVER
Chemical Analysis

Mr. B. L. Maulsby:

The following six samples were analyzed as part of the routine monitoring program at Plant Vogtle. Samples were collected March 30, and received April 1, 1981. The only unusual values are the nitrate concentrations at stations 150.9 and 151.2.

		150.6E	150.6W	150.9E	150.9W	151.2E	151.2W
pH	23° C	7.02	7.01	6.99	7.04	7.06	7.09
M Alkalinity	mg/l $CaCO_3$	20.5	20.5	20.5	21.0	20.3	20.5
Hardness	mg/l $CaCO_3$	15.9	15.6	16.0	15.9	16.0	15.9
Conductivity	µmhos	88	90.5	91	91	91.5	92
Turbidity	NTU	10	10	9	9	8	9
Sodium	mg/l Na	9.5	9.6	9.7	9.8	9.6	9.8
Potassium	mg/l K	1.39	1.42	1.41	1.44	1.43	1.44
Calcium	mg/l Ca	4.6	4.5	4.6	4.6	4.6	4.6
Magnesium	mg/l Mg	1.08	1.07	1.09	1.07	1.09	1.08
Iron	mg/l Fe	0.56	0.56	0.60	0.54	0.56	0.45
Manganese	mg/l Mn	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silica	mg/l SiO_2	8.3	8.4	8.3	8.4	8.4	8.4
Chloride	mg/l Cl	8.28	8.33	8.28	8.28	8.33	8.17
Orthophosphate	mg/l P	0.039	0.044	0.033	0.055	0.057	0.056
Total Phosphate	mg/l P	0.066	0.065	0.072	0.074	0.077	0.072
Nitrate	mg/l N	0.493	0.418	1.096	0.361	2.169	0.426
Ammonia	mg/l N	0.100	0.084	0.095	0.117	0.084	0.125

Fain D. Scott

JBS:dft

xc: Mr. W. R. Woodall, Jr.

700026

Interoffice Communication

Georgia Power

Central Laboratory
5131 Maner Road
Smyrna, Georgia 30080

July 4, 1981

SAVANNAH RIVER
Chemical Analysis

Mr. B. L. Maulsby:

Following is our analysis of six samples collected May 13 and received May 20, 1981. The 150.6 west station has a relatively high ammonia value, although it would not be considered high on an absolute basis.

Station:		150.6E	150.6W	150.9E	150.9W	151.2E	151.2W
pH	@23° C	7.18	7.10	7.12	7.11	7.10	7.09
M Alkalinity	mg/l $CaCO_3$	20.6	21.1	20.5	21.1	20.2	20.1
Hardness	mg/l $CaCO_3$	14.4	14.6	14.6	14.9	14.4	14.3
Conductivity	µmhos	88	87	87	87	84	84
Turbidity	NTU	10	7.6	8.2	8.4	9.5	8.3
Sodium	mg/l Na	9.0	9.3	9.3	9.3	9.2	8.8
Potassium	mg/l K	1.0	1.7	1.7	1.8	1.9	1.6
Calcium	mg/l Ca	4.0	4.1	4.1	4.2	4.0	4.0
Magnesium	mg/l Mg	1.07	1.06	1.07	1.06	1.06	1.05
Iron	mg/l Fe	1.12	0.68	0.72	0.71	0.83	0.66
Manganese	mg/l Mn	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Silica	mg/l SiO_2	9.6	9.2	9.0	9.0	9.2	9.2
Chloride	mg/l Cl	8.22	8.22	8.17	8.28	8.06	7.90
Orthophosphate	mg/l P	0.074	0.090	0.079	0.081	0.095	0.087
Total Phosphate	mg/l P	0.102	0.094	0.106	0.104	0.104	0.110
Nitrate	mg/l N	0.503	0.440	0.418	0.400	0.543	0.521
Ammonia	mg/l N	0.026	0.325	0.026	0.026	0.023	0.023

for Fain D. Scott

JBS:dft

xc: Mr. W. R. Woodall, Jr.

Interoffice Communication

Georgia Power

Central Laboratory
5131 Maner Road
Smyrna, Georgia 30080

July 18, 1981

SAVANNAH RIVER
Chemical Analysis

Mr. B. L. Maulsby:

The following six samples were analyzed as part of the routine monitoring program at Plant Vogtle. Samples were collected June 30, and received July 2, 1981. The pH values at four of the six stations were slightly higher than usual.

		150.6E	150.6W	150.9E	150.9W	151.2E	151.2W
pH	@ °C	9.08	6.94	6.94	8.88	9.14	8.96
M Alkalinity	mg/l $CaCO_3$	19.7	19.7	19.5	20.7	20.4	20.9
Hardness	mg/l $CaCO_3$	14.6	15.3	15.2	15.2	15.4	15.4
Conductivity	µmhos	118.7	114.6	114.9	114.9	114.0	115.8
Turbidity	NTU	6.4	8.1	7.8	6.2	6.1	6.9
Sodium	mg/l Na	8.4	8.6	8.6	8.8	9.0	9.0
Potassium	mg/l K	1.65	1.67	1.65	1.70	1.53	1.66
Calcium	mg/l Ca	4.2	4.3	4.3	4.3	4.4	4.4
Magnesium	mg/l Mg	1.01	1.10	1.09	1.08	1.07	1.07
Iron	mg/l Fe	0.78	0.86	0.73	0.77	0.75	0.71
Manganese	mg/l Mn	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silica	mg/l SiO_2	8.3	8.0	8.2	8.7	8.8	9.1
Chloride	mg/l Cl	9.61	9.34	9.40	9.56	9.24	9.18
Orthophosphate	mg/l P	0.021	0.017	0.009	0.037	0.018	0.019
Total Phosphate	mg/l P	0.079	0.110	0.090	0.100	0.090	0.091
Nitrate	mg/l N	0.472	0.414	0.460	0.472	0.409	0.493
Ammonia	mg/l N	0.013	0.014	0.013	0.015	0.013	0.027

Fain D. Scott

CLK:dft

xc: Mr. W. R. Woodall, Jr.

700026

Interoffice Communication

Georgia Power

GAS /

Central Laboratory
5131 Maner Road
Smyrna, Georgia 30080

September 9, 1981

SAVANNAH RIVER
Chemical Analysis

Mr. B. L. Maulsby:

Following is our analysis of six water samples collected August 11 and received August 14, 1981. Some of the ammonia values appear a little lower than in the past, although we have been observing a downward trend.

		150.6E	150.6W	150.9E	150.9W	151.2E	151.2W
pH	@25°C	6.83	6.88	6.86	6.85	6.70	6.85
M Alkalinity	mg/l $CaCO_3$	20.3	22.7	21.6	21.7	21.7	21.5
Hardness	mg/l $CaCO_3$	15.5	16.1	16.1	16.1	16.1	16.1
Conductivity	µmhos	85.0	86.2	85.9	86.9	85.3	85.8
Turbidity	NTU	7.7	8.2	8.4	8.8	5.6	7.8
Sodium	mg/l Na	8.2	8.4	8.2	8.3	8.3	8.5
Potassium	mg/l K	1.6	1.6	1.2	1.2	1.2	1.3
Calcium	mg/l Ca	4.5	4.7	4.7	4.7	4.7	4.7
Magnesium	mg/l Mg	1.04	1.07	1.07	1.07	1.07	1.07
Iron	mg/l Fe	0.76	0.56	0.59	0.64	0.59	0.64
Manganese	mg/l Mn	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silica	mg/l SiO_2	9.2	9.2	9.4	9.4	9.4	9.4
Chloride	mg/l Cl	7.84	7.36	7.57	7.63	7.68	7.84
Orthophosphate	mg/l P	0.069	0.084	0.085	0.097	0.081	0.090
Total Phosphate	mg/l P	0.102	0.119	0.119	0.125	0.115	0.123
Nitrate	mg/l N	0.400	1.009	0.516	0.375	0.446	0.473
Ammonia	mg/l N	0.092	<0.01	<0.01	<0.01	<0.01	0.019

J.B. Sills

for Fain D. Scott

JBS:dft

xc: Mr. W. R. Woodall, Jr.

700075

Interoffice Communication

Georgia Power

Central Laboratory
5131 Maner Road
Smyrna, Georgia 30080

October 7, 1981

SAVANNAH RIVER
Chemical Analysis

Mr. B. L. Maulsby:

Following is our routine analysis on six samples collected September 25, 1981. No parameters are unusually high or low.

		150.6E	150.6W	150.9E	150.9W	151.2E	151.2W
pH	@ 22°C	7.07	7.08	7.02	7.38	6.98	7.95
M Alkalinity	mg/l $CaCO_3$	22.8	23.3	23.0	22.9	21.8	22.9
Hardness	mg/l $CaCO_3$	15.8	15.7	16.3	16.0	16.0	15.9
Conductivity	µmhos	95.4	95.2	93.9	92.6	92.5	91.4
Turbidity	NTU	4.4	4.7	4.4	4.2	5.2	4.4
Sodium	mg/l Na	9.5	9.7	9.7	9.5	9.4	9.5
Potassium	mg/l K	1.4	1.3	1.4	1.3	1.3	1.2
Calcium	mg/l Ca	4.6	4.6	4.8	4.7	4.7	4.7
Magnesium	mg/l Mg	1.04	1.03	1.04	1.03	1.03	1.02
Iron	mg/l Fe	0.47	0.39	0.48	0.76	0.42	0.34
Manganese	mg/l Mn	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silica	mg/l SiO_2	10.0	10.0	10.0	10.0	9.7	10.0
Chloride	mg/l Cl	9.14	9.25	9.41	9.20	8.55	8.98
Orthophosphate	mg/l P	0.032	0.030	0.032	0.027	0.040	0.043
Total Phosphate	mg/l P	0.078	0.083	0.084	0.085	0.081	0.089
Nitrate	mg/l N	0.410	0.442	0.370	0.390	0.388	0.379
Ammonia	mg/l N	0.013	0.012	0.011	0.020	0.011	0.015

Fain D. Scott

JBS:dft

xc: Mr. W. R. Woodall, Jr.

700026

Interoffice Communication

Georgia Power

Central Laboratory
5131 Maner Road
Smyrna, Georgia 30080

January 19, 1982

SAVANNAH RIVER
Chemical Analysis

Mr. B. L. Maulsby:

Following is our quarterly analysis on six samples collected November 3 and received November 12, 1981. No parameters are unusually high or low.

		150.6E	150.6W	150.9E	150.9W	151.2E	151.2W
pH	@22°C	6.70	6.72	6.79	6.98	6.79	6.62
M Alkalinity	mg/l $CaCO_3$	20.0	21.7	23.5	21.3	21.5	21.8
Hardness	mg/l $CaCO_3$	17.6	17.7	18.0	17.9	18.4	17.9
Conductivity	µmhos	93.4	94.4	94.7	93.4	94.4	93.6
Turbidity	NTU	6.6	4.9	4.6	3.8	4.6	3.1
Sodium	mg/l Na	10.1	10.6	10.7	10.9	10.9	10.7
Potassium	mg/l K	1.51	1.59	1.68	1.56	1.67	1.57
Calcium	mg/l Ca	5.1	5.1	5.2	5.2	5.4	5.2
Magnesium	mg/l Mg	1.17	1.20	1.22	1.19	1.20	1.19
Iron	mg/l Fe	0.83	0.41	0.56	0.38	0.47	0.39
Manganese	mg/l Mn	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silica	mg/l SiO_2	9.7	9.7	9.4	9.4	9.4	9.4
Chloride	mg/l Cl	10.17	9.74	10.01	9.74	9.90	10.12
Orthophosphate	mg/l P	0.050	0.084	0.054	0.057	0.091	0.102
Total Phosphate	mg/l P	0.112	0.121	0.119	0.117	0.115	0.119
Nitrate	mg/l N	0.699	0.628	0.508	0.613	0.542	0.528
Ammonia	mg/l N	0.007	0.007	0.008	0.004	0.006	0.005

Fain D. Scott

JBS:dft

xc: Mr. W. R. Woodall, Jr.

700025